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Practice Characteristics That Matter In the Provision of Health Education Services By Primary Care Physicians

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by

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DEDICATION

To my wife,

Mrs. Bonita Carol Perkins Newby, my college classmate, my lifelong soulmate, and the comfort and joy of my life

and

To my parents,

Mr. George P.A. Newby, Sr., (1921-1981) and Mrs. Alma Mayola McIntyre Newby (1924-2014).They were the embodiment of love, wisdom, and service to others that I valiantly try to emulate every day

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ABSTRACT

The onset of chronic disease is occurring earlier and more often in the lives of adult citizens of the United States. The literature has effectively demonstrated the efficacy that physician provision of health education services offers their patients and the positive effects it has for lowering risk factors for chronic disease. The literature has described the complexities physicians encounter in providing these services. The literature is not as plentiful in defining and describing the characteristics of physician practice that are associated with increased health education provision.

This study is an analysis of the factors that are associated with provision of health education by primary care physicians in their offices. For this study, three years of the National Ambulatory Care Medical Care Survey, (NAMCS) are used for analysis. Selected factors germane to physician practice are analyzed for their effects on three risk factors for chronic disease; tobacco use, lack of exercise and obesity.

The study findings show that use of electronic health record systems are associated with increased odds of providing health education services over non automated physician practices. Physicians of private group practices offer health education services less often than physicians in federally qualified health centers. Use of e mail, telephone conferences, and whether the physician received

Allopathic or osteopathic training was not associated with provision of health education.

The study is relevant because of the need for a re-engineering of the financial and structural systems of physician practice that pre-empt offering health education in physician practice. Factors identified in this study, should be important considerations in the design of a new physician payment system that will incentivize physicians to include evidenced based health education as essential component of primary care delivery.

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Chapter 1

Introduction

1.1 Overview of Study

Following World War II, declining mortality rates from infectious diseases intersected with rising mortality rates from chronic disease, cancers, and unintended injuries. Causation of disease shifted, in part, from contaminated water and insects to health behavior choices such as diets consisting of saturated fats, refined sugars, salt, as well as automobile injuries, tobacco and illicit drug use. Advances in public health occurred shortly after World War II, led with the emergence of potable water, inspection of food, and expansion of safe sewage systems. The transition away from infectious diseases has signaled a need for evidenced based health education measures to become an essential component of primary care to meet the increase in chronic diseases. Behavioral risk factors have proven to be causal factors in the prevalence and incidence of chronic disease of Americans. Examples of health behaviors that serve as drivers of chronic diseases such as cancer, diabetes and cardiovascular disease are tobacco use, alcohol, and obesity that result from poor nutrition and sedentary lifestyles, (Sturm, 2002). In 2000, 125 million Americans (45.0% of the population) had a least one chronic condition, and 61 million (21.0%) had multiple chronic conditions, (Anderson & Horvath, 2004). The number of Americans with one or more chronic diseases is expected to grow steadily over

the next 30 years, (Anderson & Horvath, 2004). The current American health care delivery and financing system is designed to primarily to address acute care need more than chronic care need even though 78.0% of health spending is devoted to care for patients with chronic disease, (Anderson & Horvath, 2004). To address and improve the health needs of the United States, a mandate exists to focus on four key behavioral risks: lack of regular physical activity, unhealthy diet/obesity, tobacco use and risky/harmful alcohol use. The educational effort to combat the first three of these risks is the subject of this study.

1.2 Definition of Health Education

The World Health Organization refers to Health education as any combination of learning experiences designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes (www.who.int/en "WHO | Health education," n.d.).

Health education and health screening, together, reside under the rubric of health care preventive services. Health education differs from health screening in several important ways. Health education is dependent upon a productive joint engagement of repeated actions from between the physician and patient, (Whitlock, Orleans, Pender, & Allan, 2002). Some examples of health education services are cognitive or counseling services such as diet and nutrition, tobacco use, weight loss, reduction of high risk behaviors such as alcohol and illicit drug use.

Health screening services are procedure driven services that are largely dependent on the proficiency and competence of a physician or provider of care.

They are age/sex specific services that are done for, or on behalf of, patients at prescribed intervals during the patient's lifecycle. Examples of health screening services are diagnostic colonoscopy, mammography, stress testing, and digital rectal examinations whereby the intent is to find, or rule out, the presence of disease.

1.3 Rationale for Study

The landmark article that presents the case of the contribution of chronic disease from behavioral choices most effectively is McGinniss and Foege's *Actual Causes of Death in the United States* in 1993. In the article, the most prominent contributors to mortality in the United States in 1990 were tobacco, (an estimated 400,000 deaths) diet, activity patterns (300,000), alcohol, (100,000), microbial agents (90,000), toxic agents (60,000), firearms (35 000), sexual behaviors (30,000), motor vehicle accidents (25,000), and illicit drug use (20,000). Approximately one-half of all deaths that occurred in 1990 could be attributed to these ten contributors. Although no attempt was made to further quantify the impact of these factors on morbidity and quality of life, the public health burden they impose is considerable, and provokes a response to re-shape health policy priorities. The article arrives at the conclusion that most causes of death in the U.S. today have their disease etiology in chronic diseases stemming from poor health behaviors, (Mokdad AH, Marks JS, Stroup DF, & Gerberding JL, 2004). The primary care physician encounter is the logical and most appropriate setting for correction of damaging health behaviors yet it is at best, inconsistently used for health education services, (Podl, Goodwin, Kikano, & Stange, 1999).

The primary care physician's office is a natural setting to conduct interventions to improve health behaviors for many individuals due to the frequency of scheduled encounters or contacts with patients that occur over a number of years. Interventions that help change unhealthy behaviors of patients with chronic disease require repeated episodes to achieve modest gains over a period of time. The physician patient relationship in primary care offers this opportunity like no other setting to sustain motivation, assess progress, provide feedback, change behavior, and modify plans (Podl, et.al.,1999).

1.4 Barriers to Provision of Health Education Services

Primary care physicians are essential to the provision of health education services to patients of their clinical practice that can assist in lessening deleterious health behaviors of their patients. Physicians and their staffs play a unique and important role in motivating their patients toward healthy behaviors. Patients report that they view their physicians as trusted and expected sources of preventive health information and counsel. Surveyed physicians agree that it is their responsibility to offer preventive health education services to their patients who need them. However, despite this acknowledgement, actual adoption of the guidelines into practice has been slow and inadequate, (Cabana MD, Rand, Powe, & et al, 1999), and Wechsler, Levine, & Idelson, 1996). The majority of primary care physicians concur with the preventive care guidelines issued by the preeminent organization for promulgation of evidenced based preventive health guidelines, the United States Preventive Services Task Force, (USPSTF). Despite the USPSTF recommendation that health education services be a part of

every medical visit, its research reports a compliance rate ranging from 20% to 60% with its evidence based recommendations, (Mirand, Beehler, Kuo, & Mahoney, 2003). Consequently, the opportunity to decrease morbidity and mortality via primary (health education) and secondary (health screening) services in a cost-effective manner is compromised, (Mirand et al., 2003).

A number of barriers are present that inhibit broader use of health education by physicians. Among them is that many physicians believe they have little to no ability to change human behavior or to affect human choice. Second, is the physician's lack of formal training, and therefore competence, to advise and counsel patients, (Levine, 1987). Third, is the existence of an inverse relationship between the degree of health education measures offered and the acuity of the patient visit, (Chernof et al., 1999). The greater the urgency or immediacy of health need, the less likely health education services are offered. Regardless of the foregoing, the most compelling reasons for the de-emphasis of physician provided health education services are the interrelated factors of physician time and method of compensation, (Mirand et al., 2003).

Primary care physicians are caring for more patients, with more chronic conditions, in less time, and for which they are compensated far less than subspecialists for their work. They must absorb increasing volumes of medical information and complete more paperwork, albeit electronically, than ever as they try to function in a poorly coordinated health care system, (Lee, Bodenheimer, Goroll, Starfield, & Treadway, 2008). The clinical difficulty inherent in providing chronic disease medical management today is reflected in the estimate that it

requires 17.4 hours to provide all the quality primary and preventive care services for 30 adult patients presenting with 2 to 3 chronic diseases during the course of a day for a physician with a panel of 2000 patients, (Bodenheimer & Pham, 2010). As a result, primary care physician ranks are thinning, physician dissatisfaction with primary care as a career choice is growing, practicing physicians are burning out, and graduating residents are shunning primary care fields such as family practice, geriatrics, and internal medicine. Today, less than one in ten medical school graduates enters a primary care residency, (Porter, Pabo, & Lee, 2013).

Aligned with this concern, primary care physician compensation is approximately one third that of medical and surgical specialist physicians, (Bodenheimer, Berenson, & Rudolf, 2007). Reasons for this disparity lie in the current foundation of physician compensation. The Resource Based Relative Value Unit system, (RVU), is the platform for physician compensation in American physician practice today. RVUs financially reward procedure driven patient care such as surgeries, tests, procedures that are routinely the practice of medical and surgical specialist physicians, and ignore cognitive services that are within the practice of primary care physicians such as health education. Primary care physicians receive no compensation under the RVU system for health education of patients, hence it is not provided on a regular basis, and therefore many patients go without it. Because the RVU method of physician payment fails to offer a billing code for, and thereby compensation for health education services, it directly contributes to income disparity between primary care and

specialist physicians. It diminishes the provision of health education from the primary care encounter, and leaves the work of chronic disease management and health education of patients to overworked and uncompensated primary care physicians, (Desphande & Demello, 2010).

The rules of RVU reimbursement have contributed to physician dissatisfaction with primary care careers, and have caused a deterioration in the supply and generation of new primary care physicians as medical graduates are opting for specialist fields in medicine and surgery rather than primary care, (Deshpande & Demello, 2010). The ratio of specialists to primary care physicians directly affects the quality of chronic disease management, as patients do not receive needed health education from specialist physicians that can improve chronic disease outcomes and lower the costs of care as they do from primary care physicians who provide chronic care management services. Primary care in the United States requires a re-engineering of its prevailing organizational and financial structures in order to increase the number of primary care providers to manage an increasing demand of chronic disease care in the future.

In a health reform environment, the rules for physician reimbursement are undergoing significant change in the coming years. Physician payment is undergoing a redesign to reward outcomes, quality, and value versus volume. Physician revenue is transitioning to some form of capitation arrangement (full risk, bundled payment, global payment) versus the accumulation of office based patient encounters based fee for service payments, (APHA Issue Brief October 2010,). Under capitation, physicians are compensated by a fixed amount for

each patient each month irrespective of the number of patient encounters or procedures done on behalf of the patient. Physicians are incentivized through financial and quality measures to decrease inappropriate utilization of health services and to emphasize health promotion services. Fee for service reimbursement provides a financial disincentive to primary care physicians to offer patients health education services during the office visit encounter that could help keep patients well as physicians receive no compensation for providing these services. The system rewards volume of services over value of services. Physician payment based on capitation could remove this disincentive, and grant physicians the financial flexibility to provide health education services that may assist their patients in achieving, or maintaining health.

In addition to causing income disparity, the increased burden of chronic disease management does not allow sufficient time to provide health education services. Physician time constraints during the patient care encounter are antagonistic to good chronic disease management, and provision of health education services. The problem of insufficient time, in conjunction with the rules of fee for service compensation as the primary method of payment, are two powerful disincentives for physicians to offer non-billable yet highly beneficial health education services. This study examines whether payment based on capitation significantly assists in removing these disincentives that inhibit provision of important health education services in the primary care setting.

1.5 Summary

The quantity of research on the effectiveness of health education interventions in the primary care setting is increasing. Evidence is in place that physician-led health education can positively affect the some of the most common and important risk factors in patients, (Ashenden, Silagy, & Weller, 1997). The strongest evidence for efficacy of health education is tobacco cessation research, (Ashenden et al., 1997), although evidence is growing for other behaviors also. Efficacy grows stronger when multicomponent education measures are done, and when care is delivered in team formats versus relying exclusively on the effort of the physician.

This study will discuss the utility of incorporating health education in the primary care setting and the benefit it provides in chronic care management. This study assesses current physician performance of providing important health education services to patients with risk factors for chronic disease. It will examine whether an association exists between the delivery of health education services and the level of capitation and other key physician practice characteristics such as electronic health record use, region of the country, practice setting, physician type and whether the physician practices in a community health center or mainstream practice. The analysis will reveal the salient characteristics of physicians that are more predisposed to providing health education services. The study will discuss the evidence basis for health education, will present the argument for its inclusion in primary care, and will demonstrate how the interrelationships of an increasing chronic disease burden,

a deteriorating primary care physician workforce, and an inequitable fee for service payment system are coinciding in an extraordinarily adverse manner to suppress provision of these services that are impeding the health and wellness status of American citizens.

Chapter 2

Literature Review

2.1 Importance of Health Education in Primary Care

The aforementioned, landmark McGinness` and Foege study of 1993 was followed by a more recent study by Mokdad, Gerberding, et.al. of 2004 that substantially confirmed the McGinniss and Foege findings with the further conclusion that poor diet and physical inactivity could supplant tobacco as an even more significant cause of death in the United States, (Mokdad AH et al., 2004). Cifuentes et.al concluded that the leading causes of premature death today are rooted in four human behaviors, tobacco use, diet, physical inactivity and alcohol use, (Cifuentes, 2005), (Ewing, Selassie, Lopez, & McCutcheon, 1999). Changing the damaging health behaviors of Americans has the greatest potential of any current approach for decreasing morbidity and mortality and for improving the quality of life across diverse populations, (Whitlock et al., 2002), (Cabana MD et al., 1999).

Patient care is largely still organized around symptom driven, acute illness care, (Glasgow, Orleans, Wagner, 2001). Performance is also affected by the physician's personal attributes. Physicians who are smokers are less likely to counsel their patients on tobacco use compared to physicians who are non-smokers. A study on women in health concluded that provision of health

education for tobacco use among women physicians who are current smokers was 57.0% compared to provision of health education among women physicians who are former smokers, 72.0%, or who have never smoked, 71.0% (Eaton, Alyssa et al., 2001). Assessment of physicians' beliefs and personal behaviors is imperative to strategies to offer health education to their patients, (Easton, et.al, 2001).

2.2 Evidence Basis for the Effectiveness of Health Education

The impact of health damaging behaviors makes it imperative that healthcare providers and health systems seriously consider behavioral issues and accept the challenge of routinely providing quality health education services where proven effective, (Whitlock, 2002). Clinical Practice Guidelines are systematic statements that are designed to assist practitioners with appropriate health services for patients presenting with specific circumstances. The use of clinical guidelines should minimize clinical variation, and advance the latest advances in patient care to benefit the patient, (Audet, Greenfield, & Field, 1990).

The acknowledged preeminent entity dedicated to the research, and promulgation of evidenced based health education and health screening services is the United States Preventive Services Task Force, (USPSTF). Created in 1984, USPSTF is an independent, nonfederal, volunteer panel of national experts in prevention and evidence-based medicine. The USPSTF works to improve health of American citizens by making evidence-based health education recommendations about clinical preventive services. Primary preventive health education services are evaluated such as tobacco use, diet, exercise, alcohol

use etc. as well as procedure-focused secondary preventive services such as Pap Smears, mammography, etc. Efficacy of preventive medications are also evaluated such as aspirin therapy, and supplements. USPSTF members are clinicians that represent all areas of adult, pediatric primary care, behavioral health, and nursing. Their recommendations are based on rigorous reviews of existing peer-reviewed evidence. The results of these studies inform and educate primary care providers and patients of the applicability of specific health education services for specific chronic care needs. In 1998, USPSTF contracted with two evidence-based practice centers (EPCs) Oregon Health and Science University, and the Research Triangle Institute/University of North Carolina at Chapel Hill to specifically prepare systematic evidence reviews for the USPSTF to use in developing recommendations for health education services (Whitlock et al., 2002). Prior to that time, the USPSTF's evidence based methods were used primarily to assess efficacy of secondary preventive services or procedure screening services at the detriment of primary preventive or health education services. The USPSTF recognized this shortcoming, created an Education and Behavioral Interventions Work Group, and applied the USPSTF's analytic framework for health education interventions specifically. The USPSTF provides an avenue for knowledge transfer as primary care clinicians can obtain systematic evidence reviews, and clinical considerations of specific health education topics needed in patient care of patients with chronic disease. The USPSTF stated in its Guide to Preventive Services in 1996 that effective health education interventions that address personal health practices and behaviors

hold greater promise for improving overall health than many secondary preventive measures such as diagnostic testing and health screening, (USPSTF, 1996).

The quality and quantity of research evidence for the effectiveness of health education interventions in the clinical settings is increasing. Brief interventions integrated into routine primary care visits can address the most common and most important risk behaviors, (Ashenden et al., 1997). Effective health education interventions typically involve the use of other adjunct resources to assist patients in behavior change. In addition to physician-offered health education, adjunct interventions could include involvement of other health care team members, (pharmacists, advanced practice nurses, counselors etc.). Complementary techniques such as telephone conferences with patients, videos, self-help guides, tailored mailings, and multiple contacts post visit with patients are several examples of adjunct resources that have proven effective. USPSTF assigns a letter grade of A, B, C, D or I based on the strength of the evidence and the balance of benefits and costs of a preventive service. :

A - **Tobacco Use Education and Interventions** – As of April 2009, the USPSTF recommends that clinicians ask all adult patients about tobacco use and provide tobacco cessation interventions for those who use tobacco products.

B- **Healthy Diet Education** – As of August 2014, the USPSTF recommends that clinicians offer adults who are overweight or obese and have additional cardiovascular disease (CVD) risk factors intensive health

educational interventions to promote a healthful diet and physical activity for CVD prevention.

B- **Physical Activity Education** – As of August 2014, the USPSTF recommends that clinicians offer adults who are overweight or obese and have additional cardiovascular disease (CVD) risk factors, intensive health education interventions to promote a healthful diet and physical activity for CVD prevention.

2.3 Health Education Recommendations for Primary Care

Tobacco Use: Healthy People 2000 goals establish tobacco use as the single most preventable cause of disease, disability and death in the United States, (Schroeder SA, 2005), (Goldstein et al., 1998). Tobacco use causes more death than deaths from HIV disease, illegal drug use, alcohol use, motor vehicle injuries combined, (www.cdc.gov/tobacco/data). Despite the reductions in tobacco use since 1964, 44 million Americans continue to use tobacco. Smokers die 15 years earlier than nonsmokers as approximately 400,000 Americans die from tobacco use each year from tobacco related illnesses, such as cancer and heart disease and almost 5 million worldwide, (Schroeder SA, 2005), (Mokdad AH et al., 2004). An estimated 49,000 of these deaths are the result of secondhand smoke exposure.

A relatively new phenomenon is the concept of third hand smoke. Third hand smoke is the residual contamination from tobacco smoke that lingers long after smoking stops and remains on clothes, and furnishings, (www.cdc.gov/tobacco/data). With third hand smoke, the residues of gases,

particulate matter, carcinogens, and heavy metals such as arsenic, lead and cyanide remain behind and are absorbed or ingested by the body. A 2010 study concluded that third hand smoke can combine with ambient nitrous acid to form carcinogenic tobacco-specific nitrosamines, (Sleiman, Gundel, et.al. 2010).

Smoking during pregnancy causes the deaths of 1000 infants each year and is associated with an increased risk for premature birth and intrauterine growth retardation,(USPSTF Guide to Clinical Preventive Services, 1996). For every person who dies from tobacco use, another 20 suffer from at least one serious tobacco-related illness, (Mokdad AH et al., 2004). Cigarette smoking kills an estimated 268,000 men and 178,000 women in the United States annually. One of every five deaths in the United States is related to smoking. The three leading smoking related causes of death in women are lung cancer, (44,000), heart disease, (41,000), and chronic lung disease, (37,000). Ninety percent of all lung cancer deaths in women are attributed to smoking. Since 1950, lung cancer deaths in women have increased over 600%, (Mokdad AH et al., 2004).

The ill-health effects of smoking are well known as they apply to causation in pulmonary disease and cardiovascular disease. However, recent research has found rates of Type 2 diabetes, rheumatoid arthritis, and diseases of the immune system are higher for smokers than for non-smokers. Furthermore, physicians who have existing patients with Type 2 diabetes who smoke, or are exposed to high levels of nicotine find that insulin therapy is less effective; thereby requiring higher doses to control blood sugar, (www.cdc.gov/tobacco/data).

According to the literature, the benefits from tobacco cessation are stark, real, and cited repeatedly. The risk of dying from lung cancer is 22 times higher for men who smoke compared to men who never smoked, and 12 times higher for women who smoke compared to women who never smoked. Though cigarette smoking results in a two to three-fold increase in dying from coronary heart disease, one study concludes that one year following cessation, the risk from coronary disease drops to half of that of smokers and by 15 years later it has fallen to the rate of never-smokers. The health risk from stroke is virtually the same as for coronary heart disease, (Schroeder, 2005).

Most physicians ask their patients whether they smoke. However, despite the evidence that physician assistance can more than double the patient's odds of quitting, few physicians fully involve themselves in assisting their patients to quit, (Goldstein et al.,1998), (Cummings SR, Rubin SM, & Oster G, 1989). The USPSTF recommends that physicians screen all of their adult patients regarding their use of tobacco products and provide those that do tobacco cessation intervention. This is a grade A recommendation of USPSTF, (USPSTF Clinical Guidelines 2009).

For adult patients USPSTF through its sponsored research findings concluded in 2009 that brief behavioral education, (< 10 mins), and pharmacotherapy in physician office settings were effective in increasing the proportion of smokers who successfully quit tobacco and abstained from tobacco for one year, (USPSTF Clinical Guidelines, 2009). Though less effective, research has shown that even brief education, defined as less than 3 minutes increases quit rates in

adult patients, (USPSTF CG, 2009). Intensity of health education matters according to the research findings. Brief health education is beneficial, however longer sessions and multiple sessions are more effective. Combination therapy composed of health education and pharmacotherapy was determined to be more effective than either component performed alone, (USPSTF, CG 2009). The USPSTF population for which this evidence applies is for adults 18 years and older and all pregnant women irrespective of age. The USPSTF concludes with a high certainty that the net benefit of tobacco cessation in adult patients is substantial, and equally so is the net benefit of pregnancy tailored tobacco use education measures for women, (USPSTF, CG 2009). Research has shown that patient harm is small for health education offered.

Diet/Nutrition Education and Physical Activity: The prevalence of obesity in the United States is high, exceeding 30% in adult men and women. Obesity is defined as having a body mass index greater than 30. Obesity is associated with such health problems as an increased risk for coronary heart disease, type 2 diabetes mellitus, and various types of cancer, gallstones, and disabilities. These co-morbid medical conditions are associated with higher use of health care services and costs among obese patients. In 2008, the associated health care costs of obesity in the United States was $147 billion higher than for non-obese patients. The medical costs per person for obese patients are $1,427 higher than for non-obese patients,(Finkelstein, Trogdon, Cohen, & Dietz, 2009). Obesity is also associated with an increased risk for death, particularly in adults younger than 65 years. The leading causes of death in obese adults include

ischemic heart disease, diabetes, respiratory diseases, and cancer (for example, liver, kidney, breast, endometrial, prostate, and colon), (USPSTF, CG 2009). Weight loss in obese individuals is associated with a lower incidence of health problems and death. The USPSTF found adequate evidence that intensive, multicomponent health education interventions for obese adults can lead to an average weight loss of 4 to 7 kg, or 8.8 to 15.4 lb., (Guide to Preventive Services, USPSTF, 2014). Adults who adhere to national guidelines for a healthful diet and physical activity have lower cardiovascular mortality than those who do not, (Guide to Preventive Services, USPSTF, 2014). These interventions also improve glucose tolerance and other physiologic risk factors for cardiovascular disease, (USPSTF, 2014). The majority of cases of prostate cancer are attributable to lifestyle factors such as inactivity and high fat diets, (Lee & Lee, 2014). Physical activity and fiber intake are associated with reduced risk of breast and colon cancer while vegetable intake is associated with decreased colon cancer risk, (Calle & Thun, 2004).

The Diabetes Prevention Program, a major multicenter research study in 2002 sponsored by the National Institutes of Health, demonstrated that the combination of modest weight loss as defined as 7.0% of body weight, and modest exercise as defined as 50 minutes three times per week could reduce the incidence of Type 2 diabetes by 58.0%, (Ratner & Prevention Program Research Group, 2006). This is even beyond the benefit provided through the drug Metformin which reduces incidence by 31.0%, (Ratner & Prevention Program Research Group, 2006). Behavioral changes that occur as a result of health

education in the primary care setting have strong and substantial benefits for patients. A reduction in HbAlc of 0.5 points is the level determined by providers to be clinically meaningful. A meta-analysis of 31 studies published through 1999 showed a 0.76 point difference in HbA1c comparing behavior change initiated by health education versus control group, (Norris et al., 2002). A PubMed search of studies of diabetes self-management published between 2003 and 2009 identified a total of 10 studies whereby the average change in HbA1c was 0.82 points, (Wadden et al., 2009). The Look AHEAD program initiative that specifically focused on weight loss and physical activity achieved reductions in HbAlc from 7.3% to 6.6% over a one-year period, (Wadden et al., 2009).

The USPSTF recommends physicians offer their adult patients who are overweight, obese, and have additional cardiovascular disease (CVD) risk factors intensive health education interventions to promote healthful diet and physical activity for CVD prevention. The USPSTF conclusion of the effectiveness of intensive diet and nutrition education for patients presenting with cardiovascular risk factors is a moderate or grade B recommendation, (USPSTF Clinical Guidelines, 2014). Physician-directed health education is associated with increased efforts of patients to change damaging health behaviors, (Whitlock et al., 2002). Specific findings are present of studies that have demonstrated efficacy in reducing alcohol use, committing to tobacco cessation, improving diet/nutrition, and an exercise regimen, (Whitlock et al., 2002). Clinical health education for patients is associated with higher patient satisfaction with their providers of care, (Whitlock et al., 2002). The literature states that physicians

need proper support systems to offer health education in clinical practice. These office support systems enhance the ability of physicians to offer these services to patients. Without such systems, the physician exclusively relies upon memory, motivation, and time available to provide needed health education for patients.

As early as 1996, the Guide to Preventive Services of the USPSTF stated that the inclusion of primary preventive health education as a component of overall primary care could prove more effective in improving overall health than many secondary preventive services that focus on screening for early detection of disease. This conclusion has remained valid through the USPSTF's Guide to Preventive Services 2014 report.

Irrespective of the type of health education intervention under assessment, the literature repeatedly refers to the 5A's as the format, model or framework for implementing evidence based behavioral risk factor interventions across multiple health education targets. The 5 A's recommend that physicians Assess, Advise, Agree, Assist and Arrange, (Whitlock et al., 2002), (USPSTF Clinical Guidelines). Assess refers to assessment of the patient behaviors, culture, environment, knowledge and beliefs. Advise refers to the impact of health education advice. Agree refers to the important step of collaboratively identifying behavioral and self-management goals. Assist refers to providing a tailored action plan that helps patients identify and overcome barriers and develop skills for change. Arrange refers to making specific plans for subsequent encounters with the physician and his designees and with external resources that have the expertise to assist in patient care. Use of this model allows for the leveraging of the

physician's time and for addressing multiple behavioral risk factor interventions encountered in primary care patient settings, (Glasgow, Bull, Piette, & Steiner, 2004).

2.4 Summary of Systematic Reviews of Health Education

Following is a table and description of USPSTF sponsored research that forms the basis for the evidence-based recommendations provided to physicians in clinical practice.

Table 2.1: Multicomponent Interventions to Increase Users to Stop Smoking

Author Year	Study Design	Intervention	N	Results	Quality Rating
Bauman,et.al 2000	RCT	Mailing of booklets	85 parent-adolescent pairs	No significant difference in tobacco use between control and baseline users	Fair
Etter, et. al. 2004	RCT	G1: Tailored education, letters and booklets	2.934 adults	At 7 months, significantly more people in the intervention than in the control group were abstinent for at least 1 month. G1: 5.8%. C1: 2.2%; P≤.05	Fair
Author Year	**Study Design**	**Intervention**	**N**	**Results**	**Quality Rating**

Switzerland, Western Europe	12 months	C1: A single letter identifying the person as part of the control group	NR	No difference in abstinence between groups at 24 months	NR
Lipkus, et.al, 2004	RCT	G1: 2 self-help booklets in mail, 6 min. video	402 adolescents	No difference in abstinence at 4 or 8 month follow up	Fair
United States	2 Months	3 telephone education sessions	NR	Participants completing more likely to report cessation at 4 and 8 months (8 month OR = 1.54, 95% CI, 1.15-2.07, p<0.007)	NR
McBride et.al 2002	RCT	G1:Provider advice to quit smoking, referral to smoking cessation specialist, self-help guide, if eligible, nicotine patches	557 adults, low SES, African American	Significantly more participants of G2 than G1 were not smoking at 6 months and had sustained abstinence. (G1: 10%, G2 19%, p < 0.03	Fair
Murray, et. al 2002	RCT	G1: Ipratropium bromide inhaler, placebo inhaler	4,517 adults	More participants in G1 than in C1 had sustained abstinence (G1: 21.9%, C1: 6.0%, p<0.001	Fair

Rabius, et.al. 2004	RCT	G1: ACS booklets and standard advice plus 5 sessions of telephone education	3,522 young adults (18-25 years)	G1 had higher rates of 48 hour abstinence than C1 at 3 months. , G1: 19.6%, C1: 9.3%; p<0.005: Over 25 years: G1: 15.1%, C1: 5.3%; p<0.001	Fair
Smith, et.al 2004	RCT	G1: Telephone education, 2 follow up calls, booklet	632 adults	Intervention groups combined (G1, G2, G3) had significantly higher continuous abstinence rates than control group; G1, 2,3: 5%; C1:1.0%; p< 0.05	Fair

(Final Update Summary: Tobacco Smoking Cessation in Adults, Including Pregnant Women: Behavioral and Pharmacotherapy Interventions - US Preventive Services Task Force, n.d.)

Table 2.2: Randomized Controlled Trials for Physical Activity Interventions
Mean Change in mins per week
Low Intensity Intervention Studies (estimated 0 – 30 minutes)

Author Year Country Quality	**Population (total N, sex, age, race, ethnicity**	**Intervention Details**		**Behavioral Outcomes** **Mean PA**	**Mean Change**
			N		
de Vet, 2009 Netherlands Fair	N=709 33% men Mean age 46 Race NR	Questionnaire with section for implementation plan for	IG 397 CG 73	458 519	56 (678) 43 (800) P= NS

		walking or activity			
Grandes, 2009 Spain Good	N = 4317 34% men Mean age 50 Race NR	One brief education visit with PCP using Web based software, printed pamphlet	IG 2248 CG 2069	34.4 33.2	82.6(547.8) 65.1(527.7) P<0.05
Goldstein 1999 United States Fair	N = 355 35% men Mean age 66 3% nonwhite	One brief education visit with PCP, with PA prescription, follow-up session, monthly mailed materials, PCP training	IG 181 CG174	15 17	159 (13) 157 (7) P = NS
Halbert, 2000 Australia Fair	N=299 46% male Mean age 68 Race NR	One visit with an exercise physiologist	IG 149 CG150	Median (IQR) 3 (1-4) 2 (1-3) P<0.05	Median 0 0
			N	Mean	Mean Change
Marcus, 2007 United States Fair	N=159 18% men Mean age 44 14% non-white. Selected for sedentary behavior	Patients received booklets and tailored reports	IG 81 CG 78	27.1 28.1	49(-) 17(-) P<0.01
Napolitano, 2006	N=280 0% men Mean age 41	Personalized letter with AHA booklet.	IG 188	49.6 33.6	102.1(209.1)

United States Fair	100% non-white, Selected for sedentary behavior	Another group received 4 tailored reports plus AHA booklets	CG 92		105.9(182.1) P=NS

Medium Intensity Interventions (estimated 31- 360 minutes)

Author Year Country Quality	Population Details	Intervention Details			Behavioral Outcomes
			N	Baseline Mean (PA/ week score)	Mean Change in 6 months(SD
Delichatsios 2001, United States Fair	N = 298 28% men Mean age 46 55% nonwhite	18 automated 10 minute phone calls over 6 months using phone linked expert system	IG 150 CG 148	33.2 33.5 (kcal/kg/day)	0.6 (3.1) 0.1 (2.5) P=NS
Elley, 2003 New Zealand Good	N = 878 34% men Mean age 58 23% non-white	One brief visit with PCP, plus PA prescription, 3 phone calls from exercise physiologist, newsletters	IG 451 CG 427	11.3 12.0	
Green, 2002 United States Fair	N=316 48% men 8% non-white	Tailored report from PCP, self-help workbook, three 20-30 min. phone calls	IG 128 CG 128 (PACE score)	5.0 4.7	0.4 (1.8) 0.1 (1.8) P= NS

Hellenius, 1993 Sweden Fair	N = 79 43% men Race NR	One education visit with PCP, Offered aerobics class 2-3 times per week	IG 39 CG 39 (# PA sessions/month	5.1 5.3	6.6 (9.4) 0.1 (8.9) P<0.05
				Median	Median Chg. (IQR)
Kallings, 2009 Sweden Good	N = 101 43% men Mean age 45	One group session with physician. One education session with specialty provider including PA prescription	IG 41 CG50	2 2	1 (0-430) P<0.001
				Baseline Mean	6 Months
King, 2002 United States Fair	N = 100 0.% men Mean age 63 14% non-white	One 30 min education session with provider, 14 fifteen min. phone calls	IG 45 CG 40	186 168	
King, 2007 United States Fair	N = 218 30% men Mean age 62	Four 45 min. and two 15 min. education phone calls, multiple mailings	IG 127 CG 62	160.0 156.3	
Kolt, 2007 New Zealand Good	N = 186 44% men Mean age 74 Race NR	8 phone education sessions. Plus mailed materials	IG 83 CG 82	165.5	

Lawton, 2008 New Zealand Good	N = 1089 0% men Mean age 59 Race NR	One brief motivational interview including PA prescription and 30 min follow up visit with primary care nurse. Five 15 min calls from community exercise specialist	IG 544 CG545	10.3 11.4	
Martinson, 2008 United States Good	N = 1049 28% men Men age 57 6% non-white	4 lectures, 1 group session, 23 phone calls, library or materials available for use, 3 motivational contests over 24 months	IG 495 CG 491	21.4 27.8	12.1 0.7 P<0.004
Morey, 2009 United States Good	N = 398 100% men Mean age 78 23% nonwhite	One visit and 13 phone calls with health counselor, workbook, exercise bands, automated phone calls from PCP quarterly tailored messages	IG 199 CG 199	146.0 145.4	
Pinto, 2005	N = 100 36% men	Brief advice by PCP. 3 in person and	IG 49	38.1 45.3	62.8 (84.7) 16.6 (84.9)

United States Fair	Mean age 68 15% nonwhite	12 phone education sessions with health educator, mailed materials	CG 44		P<0.05
Yates, 2009 UK Fair	N = 98 66% men Mean age 65 25% nonwhite	3-hour group session, 2 ten min. follow-up sessions. A subset received a pedometer	IG 58 CG 29	2920 2335	

High Intensity Interventions (estimated > 360)

Author Year Country Quality	Population Details	Intervention Details		Behavioral Outcomes	
			N	Baseline Mean	Mean Change 6 months
Stewart, 2001 United States Fair	N = 173 34% men Mean age 74 Race NR	11 group sessions, one individual session, booklets, phone calls from counselor, monthly newsletters	IG 81 CG 83	1935 2057	687 (-) -9 (-) P<0.005

(“Final Update Summary: Obesity in Adults: Screening and Management - US Preventive Services Task Force,” n.d.)

Table 2.3: Randomized Controlled Trials for Diet and Nutritional Education
Fruits and Vegetable Intake Dietary Education
Low Intensity Interventions (estimated 0-30 minutes)
Fruit and vegetable portions per day

				Baseline		6 Months	
John, 2002, UK Fair	N = 729 49% men Race NR	25-minute session, plus with follow up phone call and mailed booklet over 3 months		N	Mean	N	Mean Chg. (SD)
			IG	329	3.4	329	1.4(1.7)
			CG	326	3.4		0.1(1.3) P<0.001
Lutz, 1999 United States Fair	N = 710 36% men Mean age 39 22% nonwhite	Four mailed booklets over 4 months	IG2, 3	282	3.4	282	0.86(2.45)
			CG	151		151	0.10(1.92)

Medium Intensity Interventions (estimated 31-360 minutes)
Fruits and Vegetables Only Dietary Education

Greene, 2008 United States Fair	N = 1280 27% men Mean age 75 20% nonwhite	Nine mailed newsletters, 3 tailored report, 3 phone calls over 12 months		N	Mean	Mean chg. 12 months	Mean chg. 24 months
			IG	410	8.0	2.10 (4.2)	2.2 (NR)
			CG	424	7.7	0.80(3.0) P<0.001	1.60(NR)

Cardiovascular Dietary Education
Low Intensity Interventions (Estimated 0 - 30 minutes)
Calories from fat

			Baseline	12 Months
Beresford, 1997 United States Fair	N = 4778 32% men 26% 65+ 9% nonwhite	3-minute session with PCP with self-help booklet, and follow up mail reminder	N Mean IG 859 37.6 CG 959 37.5	N Mean Chg. 859 -1.54 (5.2) 959 -0.34 (5.1) P <0.01
Fries 2005 United States Fair	N = 754 36% men Mean age 47 40% nonwhite	Mailed tailored report, plus phone call at 2 weeks and 5 booklets over 5 weeks	N Mean IG CG	
Kristal, 2000 United States Fair	N = 1459 51% men Mean age 45 14% non-white	Mailed materials, plus phone call at 1 month, and semi-monthly over 12 months	N Mean IG 604 3.62 CG 604 3.47	Mean Change 0.47 (1.83) 0.14 (1.80) P<0.001

Cardiovascular Dietary Education
Medium Intensity Interventions (Estimated 31 - 360 minutes)
Calories from fat

Brekke, 2005 Sweden Fair	N = 77 63% men Mean age 43 NR Race	Two individual sessions plus follow up phone calls for 8 months	N Mean IG 24 35.8 CG 19 34.7	Mean Change -5.3 (6.4) -0.5 (7.2) P< 0.05

King, 2002 United States Fair	N = 100 0% men Mean age 63 14% nonwhite	One individual session and 14 phone calls and food logs mailed monthly over 12 months	N Mean IG 45 10.9 CG 40 31.6	Mean Change -3.70(8.41) 0.20 (2.25) P<0.01

("Final Update Summary: Healthful Diet and Physical Activity for Cardiovascular Disease Prevention in Adults With Cardiovascular Risk Factors: Behavioral Counseling - US Preventive Services Task Force," n.d.)

2.5 Effect of Capitation on Health Education Provision

Fee for service payment is the dominant form of payment for physician services accounting for over 90 percent of practice revenue for most physicians, (Berenson & Rich, 2010). Fee for service payment has a deleterious effect on primary care physician income, quality of work life, career satisfaction and choice of specialty, (Bodenheimer et al., 2007). Reformation of this current reimbursement system is fundamental to primary care reform and the hope of a re-prioritization of inclusion of health education services, (Landon, Gill, Antonelli, & Rich, 2010). Fee for service has never been viewed as an efficient method of rewarding care that is comprehensive, coordinated, and accountable for the whole patient, (Berenson & Rich, 2010).

With the passage of the Patient Protection and Accountable Care Act of 2010, the rules for physician reimbursement are undergoing significant change in the coming years. Physician payment is being redesigned to reward outcomes, quality, and value versus volume. As mentioned, time constraints, inherent as a problem in chronic disease management, and fee for service compensation as the primary method of payment are powerful disincentives for physicians to offer

non-billable health education services. Compensation based on capitation could assist in removing these perverse incentives that inhibit provision of health education and reveal the characteristics of the providers that are more predisposed to providing these services. The following table depicts the advantages and disadvantages of fee for service versus capitation payment for health services.

Table 2.4 Payment Models for Primary Care Services

Payment Model	Key Attributes	Key Advantages	Key Disadvantages
Fee for Service	Payment per encounter	Dominant payment methodology	Payment driven by procedures and not primary preventive services such as health education
		Familiar to providers and patients	Doesn't reward enhanced access (e mail, phone correspondence with patients, group meetings)
		Has served specialist physicians well	Doesn't support practice redesign for patient needs
		Rewards physician industriousness	
		Incentivizes performance of certain secondary screening services (mammography, colonoscopy)	
Capitation	Payment per member per month	Creates clear accountability between physician and patient	Capitation rates must be case mix adjusted for financial fairness
		Provides the physician financial flexibility to do practice redesign, invest in personnel and technology to enhance practice services	Could provide an incentive to withhold more expensive services
Fixed Salary	Payment is independent of volume of	None	None

	patients encountered		

(Berenson & Rich, 2010)

Prior research done by Pearson, King, and Richards demonstrated that patients are more likely to receive health education if their primary care providers receive are compensated through capitation as the predominant method, (Pearson, King, & Richards, 2013). In this study, Pearson, et.al. demonstrated that patient visits of physicians with greater than 75.0% capitation offered more health education than visits at lower levels, (Pearson et al., 2013).

Capitation, theoretically, corrects for the overreliance on face to face office visit encounters that is foundational to the fee for service business model, (Berenson & Rich, 2010). In paying physicians an equitable age/sex adjusted per member per month payment for a population under a physician's care, the payer allows the physician to have the creativity to allocate his time and effort in new ways such as providing health education services on behalf of his assigned patients. If fee for service payment methods do not efficiently support key functions such as group health education classes, self-management skills, phone calls, e mail advice, and other strategies which improve chronic disease care for patients and can be effective ways to provide health education, then a capitation payment methodology, arguably, should offer primary care providers the financial flexibility to do so, (Berenson & Rich, 2010).

This study will examine the effect that percentage of capitation revenue has for provision of health education services in the primary care setting, and to the extent the data are available, assess the significance that ancillary practices such as e mail use and telephone calls enhance health education provision to patients.

2.6 Innovative Practices to Increase Provision of Health Education

As mentioned, primary care physicians face substantial barriers in providing primary and secondary preventive services to their patients. The literature reports several innovation practices that if adopted could significantly change the traditional practice of primary care medicine, slow the rate of burnout, and allow for new tactics in chronic disease management. Physicians are finding new roles for their support staffs such as nursing and medical assistants and elevating their roles in primary care and preventive health education services delivery. Physicians are allowing nurses to do the advanced work to organize the patient encounter such as scheduling and noting health education services due, performing medication reconciliation and recording the social history of patients. Large group practices, and community health centers that operate pharmacy services for their patients are adopting medication therapy management which allows for a new setting for questions concerning disease processes, pharmacologic therapy, and health education to occur.

Innovation is needed to make judicious use of the nation's shrinking supply of primary care physicians. Kaiser Permanente of Colorado, (KP), is a large prepaid group health plan based in California. At KP, innovations such as use of web portals for patients to view their laboratory results and speak with their physicians during scheduled telephone appointments are in place. KP physicians make use of telephone appointments for their established patients who are compliant and for which they are confident of their continued compliance. KP physicians use e mail messages for patients to assist in

education between visits. Physicians now decide whether to do 20 or more face to face encounters per day or to do fewer in conjunction with several telephone conferences with their patients per day.

A strategy that has proven useful is group appointments. At KP a group of seniors aged 60 years and above, with one chronic disease, a history of visits and use of services are scheduled appointments as a group where education can more efficiently occur. Results have shown that group visits have reduced KP hospital admissions, emergency room visits, and medical costs significantly while improving patient satisfaction and stemming physician burnout, (Hung et al., 2007). It is important to note that in this example the Kaiser Permanente organization is a prepaid group practice. As such, practice payment is in the form of capitation not fee for service. The fee for service methodology precludes any consideration of these innovations due to perverse financial incentives that are designed to maximize face to face encounters to insure payment. In the KP example, primary care physician turnover is higher than specialist turnover. It requires an average of 10 months to replace a primary care physician. It averages two months to replace a physician assistant, (Hung et al., 2007).

In addition to practice changes, the literature denotes the new use of Interactive Behavior Change Technology (IBCTs) as becoming significant as a partial solution to meeting demands of chronic disease management. Because health education is often overlooked in chronic disease management due to time constraints, etc. IBCTs are computer based tools and systems such as websites, clinic based CD ROMs, that are being used more frequently to effect health

behavior change, (Glasgow et al., 2004). Other examples include web based behavior change programs, touchscreen kiosks, interactive voice response (IVR) technologies also known as automated telephone disease management and personal digital assistants, (Glasgow et al., 2004). The rapid change in technology is readily apparent in the anachronistic reference to personal digital assistants as they have essentially been replaced by smartphone and tablet technologies not in effect in 2004. Stange, et.al. have concluded that one minute is the realistic amount of time that primary care providers can devote to health education during a typical office visit, (Stange, Woolf, & Gjeltema, 2002). The existing fee for service system of payment mandates that this one minute of prevention should be leveraged using the above mentioned strategies as much as patient safety and clinical prudence will allow. Yarnall, et. al., noted that to deliver all the USPSTF recommended preventive health education services to an average panel of patients would require 7.5 hours every working day to do so, (Yarnall, Pollak, Ostbye, Krause, & Michener, 2003). These conclusions by Okie, Stange, Yarnall and others demonstrate the virtual impossibility of the exclusive reliance on primary care physicians alone to deliver all guideline concordant preventive health education services without significant changes in the current methodology of providing care, (Okie, 2008). These articles provide a sobering juxtaposition to the prevalence, importance, and effectiveness of needed physician support strategies to assist patients in changing multiple health risk behaviors, (Fine, Philogene, Gramling, Coups, & Sinha, 2004),(Goldstein, Whitlock, & DePue, 2004).

2.7 A Conceptual Framework

The foremost framework for improvement of chronic disease management in primary care that links lower costs and improvement in the management of chronic disease is the Wagner Chronic Care model, (CCM). Defined as a heuristic or experimental model, the Wagner CCM identifies and organizes changes needed in the U.S. health care system, clinical practice, and in the patient to improve outcomes. Many of the changes recommended to improve the provision of evidence based primary health education services are embedded in the Wagner CCM. The Wagner CCM is a template and a set of organizing principles to effect change that is evidence based, population based and patient centered, (Glasgow, Tracy Orleans, Wagner, Curry, & Solberg, 2001). The Wagner CCM is not prescriptive, but is a framework that is adaptable across a variety of primary care office settings be it mainstream group practice, rural health centers or federally qualified health centers. The Wagner CCM is composed of six parts; Health System: Organization of Care, Self-Management Support, Delivery System Design, Decision Support, and Clinical Information Systems and Community Health Resources and Policies,

Health System: Organization of Care – The Wagner CCM speaks specifically to the issue of organizational leadership support, focus and commitment to chronic care management. Visual involvement and support for change by practice leadership is viewed as essential to the model's functioning as resources have to be obtained or redeployed to prioritize chronic care management in the practice. Examples of the importance of this component and

its effects on health education are acquisition of systems and tools for quality measurement, financial incentives for provision of preventive services.

Self-Management Support establishes a formalized goal setting process between the provider team and the patient. It is a collaborative process that sets goals, establishes priorities, and identifies barriers to success. This component has the greatest applicability to health education as it involves effecting behavior change such as tobacco use, smoking, exercise, nutritional choices, seat belt use,(Glasgow et al., 2001).

Delivery System Design advocates for team based provision services to patients as well as the physician. It espouses the development of clinical protocols and training that allow for other non-physician personnel with expertise such as nurse case managers, diabetic health educators, and pharmacists to provide health education services and to coordinate care and follow up for patients.

Decision Support is the fourth component which speaks to methods to provide providers with evidence based guidelines and practice protocols to provide effective chronic disease management. The CCM indicates that for this component to effect provision of evidenced based health education services, more than provider education as to utility of services is required. System design should include automated prompts of evidenced based recommendations of health education services to the physician such as provided by the USPSTF.

Clinical Information Systems is the fifth component and speaks to the need for physicians to avail themselves of the benefits of electronic health record

systems specifically the patient registry modules of these systems as they allow for the provider to have a reliance on prompts and registries to fulfill the health education needs of patients, Clinical Information Systems communicate those needs to members of the physician's care team and automates and standardizes the provision of health education services by the physician.

Community Resources and Policies is the final component of the model. The physician practice that is committed to the CCM will identify and arrange pertinent linkages in the community served that can provide peer support, affordable exercise options, focused health education classes to benefit reduction of risk factors for disease. This is particularly important for vulnerable populations such as elderly, low income, at risk children and youth. Preventive health education literature documents the importance of environmental supports to help patients initiate and sustain health behavior changes, (S. J. Curry & McBride, 1994).

When all six components of the CCM are working in an integrated way, the outcomes are productive interactions with patients. If chronic care management and health education being offered in an interdisciplinary team format versus a physician centric format the physician should have the requisite support, competencies and organization of patient care processes to improve outcomes for patients. Patients are engaged in their health care as active, informed participants rather than bystanders that are dictated to by their physician.

Taking the Wagner CCM a step further, an overlay or integration of the aforementioned 5A's model of health education provision with the Wagner CCM

can be done. **Assess** is accomplished in the Wagner CCM organization of health services component. The organization commitment to chronic disease management and aligning of practice and incentives to reward health education to patients begins with this initial stage. **Advise** is accomplished within the Wagner CCM Decision Support component that enables the physician to offer the state of the art in evidence based health education and prevention measures that are age and sex appropriate for his patient given presenting risk factors. Advise is also accomplished in the CCM Delivery System Design component as an interdisciplinary team focus replaces a physician centric focus by making use of diabetic health educators, pharmacists, nurse case managers, nutritionists, referral clerks, etc. to provide education preventive services to patients with chronic disease. **Agree** is accomplished during the CCM Self-Management Support component as goals are established between the physician and patient and barriers to achievement are identified and strategies to overcome barriers are developed. **Assist** is accomplished via CCM Clinical Information System component. The physician assists his patients by reminders and scheduling of needed preventive health education services through the reliance on patient registries, prompts, technologies (ICBTs) and brings these new education resources as a benefit for patients. **Arrange** is done in the CCM Community Resources and Policies component of the model though aspects of arranging of community resources. The physician and his/her team coordinates external resources on behalf of the patient. Such examples are tobacco quit lines, group weight loss classes, community diabetic health education classes often held in

public libraries or at community colleges. The CCM offers the conclusion that if done then productive interactions between providers and patients are obtained and improved functional and clinical outcomes occur.

Figure 2.1: Conceptual Framework of the Wagner Chronic Care Model (Hung et al., 2007), (Glasgow et al., 2001).

The literature contains several examples of how health education services align with the tenets of the Wagner Chronic Care Model. Group Health Cooperative, (GHC), of Seattle, Washington is one example of a well-documented effort in the use of the Wagner CCM in tobacco cessation for which some evaluation of the model's utility has been done.

Organization of Care – GHC leadership identified tobacco use as the organization's number one prevention priority. Clinical processes and protocols

related to smoking were identified and improved. GHC systems and structures were redesigned to identify tobacco intervention goals and cessation targets were established in GHCs business plans. Patient co-payments were eliminated for tobacco cessation follow up visits and encounters, (Susan J. Curry, Grothaus, McAfee, & Pabiniak, 1998).

Clinical Information Systems- GHC physicians identify enrollees who smoke at the initial visit. The GHC clinical information system (CIS) monitors patient compliance with medications, use of quitting services, prompts education calls and generates progress reports.

Delivery System Design – The GHC smoking cessation program is interdisciplinary and is designed to minimize the burden of care for the physician through involvement of other health professionals. It makes use of telephone based health education and follow up support to ascertain smoking status of patients and to determine the effects of nicotine replacement therapy.

Decision Support – GHC developed its smoking cessation clinical guidelines on the basis of the 5A's model consistent with the USPSTF. GHC distributes all evidence based guidelines to all of its physicians via its information system to insure that effective knowledge transfer is done.

Self-Management Support – GHC's program, termed *Free and Clear*, uses a behavioral self help guide for its patients. Additionally, it provides access to telephone based health education, a quit line staffed by cessation specialists. Other techniques used are program materials, mailings pharmacotherapy and psychosocial support.

Community Resources – important links to patients are done by practice staff for weight loss as weight gain often occurs during cessation. GHC has worked to advocate for tobacco excise taxes and tobacco settlement funds for health education activities, elimination of tobacco vending machines, and smoke free buildings.

GHC documented improvement in increasing rates of tobacco cessation from 40.0% to 80.0% of its patients,(Hung et al., 2007). In the Group Health study, 23.0% of its smokers exhibited a biochemically confirmed 16 month quit rate,(Hung et al., 2007). Six month quit rates for GHC patients ranged from a low of 28.0% to 38.0%,(Hung et al., 2007). By 2004, the prevalence of tobacco use at GHC declined from 25.5% to 15.5% in comparison to the state of Washington decline of 23.7% to 21.8% for the same time period,(Hung et al., 2007). Compared to continuing smokers, patients who participated in the GHC cessation program were found to have significantly lower use of inpatient and outpatient health care services three to five years after completing the program.

2.8 Health Education and Community Health Centers

Another example of use of the Wagner CCM is work of nation's community health centers, (CHCs). CHCs provide access to health services for over 20 million citizens the majority who have multiple chronic diseases, representative of a racial minority, female, and are low income. CHCs encounter more patients with diabetes than mainstream physician practices, 13.2% to 9.5%, $p < 0.01$, (Shi, Lebrun, Tsai, & Zhu, 2010). Similarly CHCs encounter more patients with obesity

and at risk for chronic disease than traditional group practices 9.2% to 6.5%, p< 0.05, (Shi et al., 2010).

The Health Resources and Services Administration through its Bureau of Primary Health Care began a six-year Health Disparities Collaborative designed to meet the need to improve chronic disease management and to reduce health disparities of patients encountered in the nation's community health centers. The Collaborative employed the Wagner Chronic Care Model in this effort with an initial focus on diabetes quality improvement. All six of the CCM components were operationalized. Results reported attributed to use of the model over a four year period were HbAlc levels declined, eye referral rates increased, as did foot examinations in study patients,(Chin et al., 2004)

Shi, et. al., concluded in a cross sectional study of the 2006 National Ambulatory Medical Care Survey, (NAMCS), that community health centers enroll their patients with chronic disease in disease management programs more frequently than private group practice physicians, 14.1 (3.6) to 12.6 (1.9). Health Center physicians order health education services more frequently such as asthma education to their asthmatic patients, weight reduction counseling for their overweight patients and tobacco cessation counseling to their patients that smoke more than their private group practice counterparts (Shi et al., 2010), (Hing, Hooker, & Ashman, 2011).

Research has shown that health center patients with hypertension are more likely to receive education compared to their national counterparts with regard to diet, (75.0% to 67.0%), salt intake, (82.0% to 69.0%), exercise (84.4% to 64.0%) and

taking medications 91.0% to 84.0%), (Pleis, Lucas, & Ward, 2009). Health center patients with hypertension are more likely to comply with education initiatives regarding diet, exercise and medications than their national counterparts, (Pleis, Lucas, & Ward, 2009).

2.9 Electronic Health Record Systems and Health Education

The Wagner CCM is reliant upon the use of clinical support systems. Electronic Health Record Systems, (E.H.Rs) as an advanced clinical support system provide a mechanism to integrate evidence-based recommendations for health education and preventive services with primary care. E.H.R technology can systemically remind providers to offer health education services during visits. Reminders to patients generated by E.H.R systems increase patient compliance with preventive health recommendations, (Hillestad et al., 2005). Condition-specific templates, that are components of E.H.Rs, can be custom designed by providers to enable standard provision of health education and other preventive services for all providers in a medical group that enhance quality and minimize variation in care delivery, (Hillestad et al., 2005). E.H.Rs allow individual practices to connect to national disease registries facilitating benchmark comparisons of outcomes with other providers,(Hillestad et al., 2005).

Research has shown that patients comply with physician led health education services only 10 percent of time education is offered when done only as a single component, (Hillestad et al., 2005). It is estimated that multi-component strategies of higher intensity such as patient-physician messaging, electronic health education offered between patient visits, electronic reminders, and

decision support for providers from certified E.H.R systems increase compliance and could produce long term savings in chronic disease of $40 billion annually, (Hillestad et al., 2005). Prior research through Linder, Ma, Bates, et.al. has demonstrated through a study of the 2003 and 2004 NAMCS datasets that while no association exists between E.H.R. use and overall quality of patient care, the study did conclude that tobacco cessation rates were significantly greater from physicians who employed E.H.R.s and those who did not, (Linder, Ma, Bates, Middleton, & Stafford, 2007).

Research has shown that E.H.R. use is increasing in ambulatory based practice in the U.S. Use of E.H.R.s by office based physicians has increased from 18.0% in 2001 to 78.0% in 2013 ("NCHS Data Brief, Number 143, January 2014 - db143.pdf.). With this increase comes an expectancy that health education provision will increase as electronic reminder and electronic order entry components of E.H.R. systems are operationalized, (Li Zhou et al., 2009).

One driver for increased E.H.R. use has been the advent of E.H.R. Incentive programs offered by the Centers for Medicare and Medicaid Services through the implementation of Meaningful Use standards. The Medicare and Medicaid programs offer incentive payments to physician practices that demonstrate meaningful use of certified E.H.R. technology. Two of the Stage 2 Core Set Objectives are for the provider to record smoking status of patients encountered and a second is to use clinically relevant information to identify patients for preventive and follow up care and use electronic reminders for care (NCHS Data Brief, Number 143, January 2014 - db143.pdf)

2.10 Research Questions

This study is a correlational study of primary care physician characteristics and their statistical relationship to provision of health education services. The study will examine the relationship between percent of capitation revenue and or predictor variables), and their effect on provision of health education services for patients (dependent variable) across various practice settings. The following specific questions are asked:

- Is there a difference in health education services provided to patients between more highly capitated revenue primary care physician practices versus lower capitated revenue physician practices?
- Is there a difference in health education services offered to patients by physicians who use Electronic Health Record systems and those that do not?
- Is there a significant difference in health education services offered to patients from physicians who work in community health centers as their practice setting, and those that work in private group practice settings?

2.11 Source of Data

The study is a correlational study of the National Ambulatory Medical Care Survey datasets (2009, 2010, and 2011). Though the 2012 dataset was available, it did not contain several of the variables needed for study such as community health centers, and overall health education. The 2009-2011 datasets contain all of the variables required for the study. Selected data elements for analysis are:

Independent Variables (Physician Characteristics)

- Practice Setting (Community Health Center vs. Private Group Practice
- Percent of Capitation Revenue
- Electronic Health Record Use (Users vs Non Users)
- Physician Type (Allopathic or Osteopathic)
- Capitation (Is the practice open to new patients under capitation)
- Electronic Mail (does the physician use e mail to communicate with patients)
- Telephone (does the physician use telephone to communicate with patients)

Independent Variables (Patient Characteristics)

- Age Group
- Region
- Payment Type (expected source of payment)
- Race
- Ethnicity
- Sex

Dependent Variables

- Was any health education service offered
- Was weight reduction education offered
- Was tobacco cessation education offered
- Was exercise education offered

The findings from this study will validate the existing knowledge about the importance and factors that drive utility of health education in primary care practice. It will reveal whether a concern exists that health education services are being made available to all patients irrespective of setting; setting whether geographic or clinical. And finally, the study will determine whether certain physician descriptors show an association with provision of these services. The findings could be pertinent to a reformation of the existing system of physician payment that could facilitate inclusion of health education, improve chronic care management of patients, and assist in the growing refocus toward patient outcomes (value), versus patient output, (volume).

Chapter 3

Methodology

3.1 Data Source and Study Design

Factors associated with selection of a data source and study design began with finding, and selecting the most appropriate physician specific secondary dataset containing the physician metrics, practice attributes required, and to assess those factors pertinent to provision of health education in physician practice. The study found three publicly available datasets that met these criteria that used the physician visit as the unit of measure. Those datasets were the National Hospital Ambulatory Care Survey, (NHAMCS) of the National Center for Health Statistics, (NCHS), the Community Tracking Study of the Center for Studying Health System Change, (CSHSC), and the National Ambulatory Medical Care Survey, (NAMCS), also of NCHS.

NHAMCS is a national probability sample survey of visits to hospital based outpatient clinics, and emergency departments across the United States conducted by the National Center for Health Statistics, Centers for Disease Control and Prevention, (2011 National Hospital Ambulatory Medical Care Survey Public Use Data File Documentation - doc11.pdf). NHAMCS uses the physician visit as the unit of measure. A review of the dataset documentation shows that the key dependent variables of tobacco use, weight reduction, exercise, and health education provision are present in the dataset. The dataset

also records physician use and non-use of hospital electronic health record systems, and whether the hospital clinic is located in an MSA or not. The ability to select primary care physicians for study is limited by the type of outpatient clinic setting in NHAMCS. The NHAMCS record format establishes a code for internal medicine clinic visits but not for other primary care clinic specialties such as family practice, pediatric or geriatric clinics. By using the NHAMCS dataset, these primary care specialties would be absent from an analysis of provision of health education in primary care. The record format of the NHAMCS data set also does not include other predictor variables that are germane to the study such as percentage of revenue from capitation, practice setting (community health center or private group practice), and whether the physician is allopathic or osteopathic.

A second dataset evaluated for use is the Community Tracking Study, (CTS). CTS is a physician survey of information concerning physician practice and attributes. The study is performed by the Center for Studying Health System Change under the auspices of the Robert Wood Johnson Foundation, (Kemper et al., 1996). A review of the CTS survey documentation shows that the record format includes the variable practice setting (community health center and group practice). It also includes other key covariates of this study such as percentage of capitation revenue, and presence or absence of electronic health record use. The dataset does not assess physician type, region or any of the key independent variables the study uses to examine health education. Also, CTS relies on self-reported information through a telephone survey of physicians,

hence it is reliant on physician estimates for practice data. It is not, abstracted data from health records such as NHAMCS or NAMCS.

The third data set evaluated is the National Ambulatory Medical Survey, (NAMCS). All variables used for study are contained in the dataset for study and analysis. Like NHAMCS, NAMCS is a national probability sample survey of visits to office-based physicians conducted by the National Center for Health Statistics, Centers for Disease Control and Prevention. It is a component of the National Health Care Surveys which measure health care use across differing types of physician and midlevel providers,(2011 National Ambulatory Medical Care Survey Public Use Data File Documentation).

The unit of measure in NAMCS is the patient care encounter or visit. Only visits to non-federally employed physicians classified by the American Medical Association (AMA) or the American Osteopathic Association (AOA) as "office-based, patient care" were included in NAMCS. Physicians in the specialties of anesthesiology, pathology, radiology, hospitalists, and physicians not primarily engaged in office practice, and physicians who were older than 85 years of age were excluded from the physician survey. Types of patient encounters, (visits) not included in NAMCS were calls for telephone advice, billable visits performed outside the physician's office such as house calls or nursing home visits, visits made in hospital settings unless the physician has a private office in a hospital and that office meets the NAMCS definition of “office.” Visits made in institutional settings by patients for whom the institution has primary responsibility over time.

Examples are nursing homes or prisons, and visits to doctors' offices for administrative purposes only were also excluded from the dataset.

NAMCS was selected as the preferred dataset. The study combined the 2009, 2010, and 2011 datasets for study to generate increased sample size. The robustness of the NAMCS datasets provided sufficient power for analysis. Each year supplied a minimum of 30,000 patient visits for analysis creating 94,382 total patient encounters for analysis.

The study is explanatory research. It is a correlational study of a secondary data set using non-experimental design. It analyzes three hypotheses to determine if key predictors are statistically correlated with performance of health education services.

3.2 Study Population

The NAMCS dataset is a record of various services associated with a physician encounter or visit. For this dataset containing three years, NAMCS surveyed 4004 physicians and generated 94,382 Physician Record Forms or (PRFs). The PRF is the manual data collection instrument used for study. A trained census field representative abstracts required data from the health records of patients and completes the PRF in the physician's office for each visit. For purposes of this study, the provision of selected health education services during office visits of primary care physicians is of importance. Consequently, the data set was reduced to primary care physicians by choosing the NAMCS category [SPECCAT] and limiting the responses to group 1, "Primary Care

Specialty Group" only. This selection reduced the dataset from 94,382 visits to 42,450 visits. This subset of visits was the encounter data used in the analysis.

3.3 Study Variables

The health education variables were obtained through abstracting information into the PRF from patient health records. Responses were yes, no, or missing. Other variables that were available for study were asthma education [ASTHMAED], diet/nutrition [DIETNUTR], family planning, [FAMPLAN], growth/development, [GREWTHDEV], injury prevention, [INJPREV], stress management, [STRESMGT]. For the study, four dependent variables with implications for chronic disease were chosen for study; one overall dependent variable and three sub-dependent variables. The dependent variable [HLTHED] asks the question was any health education provided on this visit. The variable [EXERCISE] asks was exercise education provided during this visit. This variable addresses any topic related to the patient's pursuit of physical conditioning and fitness.

The variable [TOBACED] asks was smoking cessation education provided. It assesses whether any information was given to the patient to help them curtail tobacco use in any form, including cigarettes, cigars, or smokeless tobacco such as chewing tobacco. It also assesses the patient's exposure to second hand smoke. The variable references the primary care physician's referral of the patient to other health professionals for smoking cessation programs. Variable [WTREDUC] asks was weight loss education provided during this visit. It asks if information was given to the patient to assist in the goal of weight reduction and

whether referrals to specialized health professionals or community resources for the purpose of weight reduction was done.

Independent Variables – Physician Characteristics

The study identifies independent variables or predictor variables that focuses on physician characteristics and patient characteristics associated with patient encounters. Variable [MDDO] assesses the type of primary care doctor, (osteopathic or allopathic). Variable [EMEDREC] asks the question does the practice utilize an electronic health record system in practice. Variable [REVCAPR] asks what percentage of practice revenue is obtained in the form of capitation. The variable [REVTYPOFF] determines if the patient visit occurred in a community health center setting or private practice (solo or group) setting. The variable [CAPITATE] denotes if the practice is available to new patients under capitated arrangements. The variable [ECONR] denotes if the practice uses electronic mail to communicate with patients. And finally, the variable [TELCONR] determines if the practice uses telephone conferencing to communicate with patients.

Independent Variables – Patient Characteristics

The variable Age Group classifies patients into discrete age categories. The variable REGION classifies patients into four geographic locations. PAYTYPER denotes the payment source or insurance status for patient visits. RACE, ETHNICITY and SEX are general demographic descriptors of patients encountered.

3.4 Hypotheses to Be Tested

- RQ1: Is there a significant difference in the health education scores of patient visits of highly capitated primary care physician practices and lower capitated physician practices?
    - H_1: Health Education scores will be higher for patient visits when capitation increases as a percentage of practice revenue compared to patient visits of physicians with lower percentages of capitation revenue.
- RQ2: Is there a significant difference in the health education score of patient visits of physicians who use an Electronic Health Record and those physicians that do not?
    - H_1: Health Education scores will be higher for patient visits of physicians who employ full use of electronic health record systems versus physicians who do not use an electronic health record system in practice.
- RQ3: Is there a significant difference in the health education score of patient visits of primary care physicians who work in community health centers as their practice setting, and primary care physicians that work in private group and solo practice settings?
    - H_1: Health Education scores will be lower for patient visits of physicians who work in private group practice settings than visits of primary care physicians of community health center settings.

3.5 Analytic Approach

The NAMCS dataset uses a multi-stage probability design for its sampling methodology. The design accounts for three stages of probability sampling; geographic primary sampling units, physician practices within primary sampling units, and patient visits within the physician practices to produce weighted national estimates that describe the utilization of ambulatory medical care services in the United States.

To analyze the multi-tiered sample data accurately, the study uses the Complex Samples Procedure within IBM's SPSS as the foundation for producing all analytics generated. As a result, the 42,450 patient visit sample comprising the merged NAMCS dataset represent 1,694,722,892 patient visits to primary care physician offices from 2009-2011. The study provides an initial description of the dataset that displays the number, frequencies, percentages and standard error of the sample of variables in the study. Missing variables were removed as were other variables not germane to the study. The study establishes health education, [HLTHED], exercise, [EXERCISE], weight reduction [WTRED], and tobacco education, [TOBACED] as categorical dependent variables.

The second level of analysis uses bivariate analysis or crosstabs procedure to individually test the four dependent variables for association against each of the seven physician predictor variables; electronic health record use [EMEDREC], practice setting, [REVTYPOFF], level of capitation, [REVCAPR], accepting new capitation, [CAPITATE], teleconferences with patients [TELCONR], allopathic or

osteopathic physicians [MDDO], and use of e mail consults with patients, [ECONR].

The final level of analysis the study provides is a multivariable analysis using logistic regression. The study uses Wald Chi Square as the test statistic for the logistic regression procedure. It tests for significance for each independent variable and provides odds ratios and confidence intervals for each covariate. The resulting analysis informs each of the three hypotheses and allows for a discussion of the presence or absence of anticipated predicted relationships and associations.

The analysis models the probability that a patient visit included health education during that encounter. The procedure models the probability of yes (education was provided during the visit). For each research question, the dependent variables (HLTHED, TOBACED, EXERCISE, and WTREDUC) were established as dichotomous variables (0 = No, 1 = Yes). The study establishes the predictor variables as dichotomous or categorical variables; MDDO (1=Doctor of Medicine, 2=Doctor of Osteopathy),CAPITATE 1=Yes, 2=No, EMEDREC 1= Yes all electronic, 2= No, REVTYPOFF (1= Private Group/Solo Practice, 2= Community Health Center), ECONR (0=No , 1=Yes), TELCONR (0=No, 1=Yes), and REVCAPR (1= less than or equal to 25.0%, 2= 26.0% - 50.0%, 3=51.0% - 75.0%, and 4= greater than 75.0%.

Several variables offered more than two categories needed for analysis. The study considered these options as extraneous to the research questions and were therefore not used. For example, EMEDREC offered 2 = part paper and

part electronic. REVTYPOFF offered 2 = freestanding urgent clinics, 4 = mental health center, 5 = non-federal government clinic, 6 = family planning clinic, 7 = health maintenance organizations, 8 = faculty practice plan, and 9 = other.

The analytical approach for RQ 1 will be to observe whether an association exists between higher levels of capitation revenue and provision of various health education services. The analysis seeks to discern whether higher percentages of capitation revenue are associated with increased odds of provision of health education services. The dataset displays percentages of capitation in quartiles. Due to the distribution of variables, the study combines the third and fourth quartiles into the third (51.0%-75.0%) category.

The analytical approach for RQ 2 will be to observe whether health education services offered during the physician visit is associated with full use of electronic health records, (Yes), or no use, (No). Though the data are available in the file, the study is not interested in partial use of electronic health record systems. The analysis seeks to discern whether full use of electronic record systems is associated with higher levels of health education services to patients. The study establishes yes or full use as the reference point for significance and direction of observed associations.

The analytical approach for RQ 3 will be to determine if an association exists in the scores of health education in physician visits of community health center physicians and health education in physician visits of physicians in private group practice. The study does not assess physicians in other settings such as HMOs, faculty practice plans of academic health centers, etc. Because health centers

have benefited from formalized training in operationalizing the Wagner CCM through the Health Disparities Collaborative sponsored by the Health Resources and Services Administration in 1998, the study intends to find if community health center physician visits are associated with higher levels of health education than private group practices that may have not benefited from formalized training in the CCM. The study establishes the community health center category as the reference point for significance and direction of association.

3.6 Description of Study Variables

Table 3.1 Dependent Variables

Variable Definition	**Source**	**Type**	**Variable Name**	**Code**
Health Education	NAMCS 2009, 2010 and 2011	Categorical	HLTHED	1= Yes 0= No
Variable Definition	**Source**	**Type**	**Variable Name**	**Code**
Tobacco Use	NAMCS 2009, 2010, and 2011	Categorical	TOBACED	1= Yes 0 = No
Exercise	NAMCS 2009, 2010, and 2011	Categorical	EXERCISE	1= Yes 0= No
Weight Reduction	NAMCS 2009, 2010, and 2011	Categorical	WTREDUC	1= Yes 0= No

Table 3.2 Independent Variables

Practice Setting	NAMCS 2009, 2010 and 2011	Categorical	REVTYPOFF	1=private group practice 2=community health center
Electronic Health Record Use	NAMCS 2009, 2010, and 2011	Categorical	EMEDREC	1=Yes 2= No

Capitation Level	NAMCS 2009, 2010, and 2011	Categorical		1=<25.0% 2=26.0-50.0% 3=51.0%75.0%
Accepts Capitation	NAMCS 2009, 2010, and 2011	Categorical	CAPITATE	1= Yes 2=No
Physician Type	NAMCS 2009, 2010, and 2011	Categorical	MDDO	1= MD 2= DO
Telephone Consults	NAMCS 2009, 2010, and 2011	Categorical	TELCONR	0= No 1=Yes
E Mail Consults	NAMCS 2009,2010, and 2011	Categorical	ECONR	0=No 1=Yes

Chapter 4

Results

4.1 Descriptive Statistics

Table 4.1 shows the distribution of physician characteristics of visits in the study. In the sample, approximately ninety-five percent of visits occurred in private group practices. Approximately five percent occurred in community health centers. Ninety one percent of physician visits were in practices for which compensation was less than or equal to 25.0% of total revenues. This is despite the fact that sixty-two percent of physicians were open to receiving new patients under a capitation arrangement. Ninety percent of primary care visits selected allopathic trained physicians rather than osteopathic. The majority of visits, (53.0%), were to physicians that were current users of electronic health record systems and used teleconferencing, (63.0%), to correspond with their patients to enhance patient care. Finally, eighty-seven percent of physicians sampled did not use electronic mail to enhance or improve patient care in their practices.

Table 4.2 shows the distribution of patient characteristics of visits reviewed in the study. In the study, sixty percent of patient visits were female patients. More than eighty percent of visits were white and Non-Hispanic patients.

Table 4.3 shows the distribution of health education services offered by physicians during the patient visit. The dataset shows that a health education

service is provided 45.0% of the time during primary care visits. In congruence with the literature review that states that health education services are poorly done, exercise education was offered ten percent of the time. Tobacco cessation and weight loss education were offered only five percent of the time.

The study makes the assumption that other health education services such as family planning, alcohol use, injury prevention available in the dataset are also offered in addition to those of interest to this study.

4.2 Inferential Statistics

Research Question 1: (RQ1) asks is there a significant difference in the health education scores of patient visits of highly capitated primary care physician practices and lower capitated physician practices?

The study hypothesized that Health education scores will be higher for patient visits when capitation increases as a percentage of practice revenue compared to patient visits of physicians with lower percentages of capitation revenue.

The study found no association between level of capitation and any of the dependent variables measured, (Tables 4.4-4.11). Previous research performed a similar analysis using an earlier NAMCS dataset concluded that a relationship existed between the highest level of capitation and health education provision,(Pearson, King, & Richards, 2013). In this study, the highest level of capitation (>75.0%) was removed from study due to the study's choice to identify its sample of primary care physicians by using the variable SPECCAT 1 (primary care specialty) versus PRIMCARE (are you the patient's primary care physician). By using this variable, no observations were present at the highest reference

level,(>75.0%). The study removed this level and re-established the highest reference level at 51.0%-75% capitation. Comparisons using this as the referent level yielded no significant association and therefore does not support the hypothesis.

Research Question 2: (RQ2) asks is there a significant difference in the health education score of patient visits of physicians who use an Electronic Health Record and those physicians that do not. The study hypothesized that Health education scores will be higher for patient visits of physicians who employ full use of electronic health record systems versus physicians who do not use an electronic health record system in practice. The study found a statistical relationship between electronic health record use and provision of tobacco education services for patients. Bi-variate analysis shows a statistically significant relationship between overall health education and electronic health record use, (p=0.018), (Table 4.5). Multi-variate analysis shows a relationship between electronic health record use and tobacco cessation counseling, (OR 1.646 and 1.645, p=.002), (Table 4.8). Within the category of tobacco cessation, the hypothesis is partially supported as patient visits in which electronic health record systems were used are more likely to receive tobacco cessation counseling than those visits that do not, (OR 1.646, CI 1.206 – 2.247) and (OR 1.645, 1.198 – 2.259).

Research Question 3:(RQ3) asks is there a significant difference in the health education score of patient visits of primary care physicians who work in community health centers as their practice setting, and primary care physicians

that work in private group and solo practice settings. The study hypothesized that Health education scores will be lower for patient visits of physicians who work in private group practice settings than visits of primary care physicians of community health center settings. The study observed an association between the type of office setting and the provision of tobacco cessation counseling in the analysis. Bi-variate analysis shows a statistically significant relationship, (p=0.05) as did multi-variate (OR .448, p=.028), (Tables 4.6 and 4.8). The hypothesis is partially supported in that for tobacco cessation patient visits that occur in private group practices are less likely to receive tobacco cessation counseling or education than patient visits that occur in community health centers, (OR .440, CI .211 - .918). None of the independent variables show any significant association with the dependent variables of exercise and weight reduction.

Other findings observed were for age group, ethnicity and payment source. Across all dependent variables, an association was found for the age group variable both positively and negatively. For weight reduction a negative association was observed for pediatric patients (OR .150) while for adult patient visits, a positive association was found for patients aged 45-64 (OR 1.853), and patients aged 65-74 (OR 1.650), (p<.0001) when compared to a referent level of greater than 75 years old, (Table 4.10). For the dependent variable exercise, no association was observed for pediatric patients, but an association was present for teenage and young adult patients in the age groups 15 -24 (OR 1.491), 25-44 (OR 1.306), 45-64 (OR 1.391), p =0.16, (Table 4.9). Finally, the study shows for the variable any health education an association for each age group, (Table

4.11). Patients less than 15 years (OR 1.599), 15 – 24 (OR 3.600), 25 – 44 (4.179), 45 – 65 (5.705) and patients aged 65 -74 (2.940) p=0.17.

The study observed a finding in regard to patient's sex and ethnicity. The study observed that despite the fact that 60.4% of visits were female, (Table 4.2), patients, for the categories of tobacco education, and any health education, female patients were less likely to receive education in these disciplines than male patients, (OR, .800, p=0.12, and OR, .702, p=.004), (Tables 4.8 and 4.11). No association was observed for any of the remaining dependent variables. The study observed an unexpected finding that with regard to ethnicity, Hispanic patients are more likely to receive tobacco cessation education, and weight reduction education than non-Hispanic patients, (OR 1.629, p<.0001, and 1.591 p=.011), (Tables 4.8 and 4.10).

The study previously indicated that use of interactive behavioral change technology, (ICBT) could offer provision of health education beyond the traditional face to face patient encounter,(Glasgow et al., 2004). The data set for this study provided the variables use of electronic mail and telephone conferencing as ICBT type practice attributes useful for study. The study found no association any of the health education variables except for the overall health education variable. Physician visits for which the physician does not use teleconferencing strategies with patients are less likely to provide health education to practice patients, (OR, .760, p=.033) than physician visits that do, (Table 4.5). No association was observed for region, race, previously stated physician type (allopathic/osteopathic), or acceptance of new capitation and the

health education variables. Following are the listing of tables. Significant

`associations are in bold.

4.3 Listing of Tables: Analysis of Study Variables

Table 4.1 Visits by Physician Characteristics

Variable	Unweighted Observations	Percent	Standard Error
Office Setting			
PGP	29396	95.2%	0.6%
CHC	10127	4.8%	0.6%
Total	39523	100%	0.0%
Percent Capitation			
<25.0%	33668	91.5%	1.3%
26.0%-50.0%	2124	5.0%	0.9%
51.0-75.0%	1413	3.8%	0.8%
Total	37205	100.0%	0.0%
EMR Use			
Yes	18764	53.0%	2.1%
No	17626	47.0%	2.1%
Total	36390	100.0%	0.0%
MD or DO			
MD	36562	90.7%	0.8%
DO	5888	9.3%	0.8%
Total	42450	100.0%	0.0%
Accepts Private Capitation			
Yes	22657	62.3%	1.9%
No	13811	37.7%	1.9%
Total	36468	100.0%	0.0%
Phone Consults			
Yes	22964	60.1%	1.9%
No	17695	39.9%	1.9%
Total	40659	100.0%	0.0%
E Mail Consults			

Variable	Unweighted Observations	Percent	Standard Error
Yes	4488	12.9%	1.3%
No	36391	87.1%	1.3%
Total	40879	100.0%	0.0%

Table 4.2 Visits by Patient Characteristics

Variable	Unweighted Observations	Percent	Standard Error
Age Group			
<15	10541	24.5%	0.8%
15 - 24	4196	9.1%	0.3%
25 - 44	10004	21.6%	0.6%
45-64	11086	25.4%	0.5%
65-74	3392	9.5%	0.3%
75>	3231	9.8%	0.5%
Total	42450	100.0%	0.0%
Patient Sex			
Female	26075	60.4%	0.6%
Male	16375	39.6%	0.6%
Total	42450	100.0%	0.0%
Race			
White	33431	81.9%	1.1%
Black	6062	12.7%	1.1%
Other	2957	5.5%	0.5%
Total	42450	100.0%	0.0%
Expected Payment			
Private Insurance	20257	58.8%	1.3%
Medicare	6577	19.8%	0.8%
Medicaid	9308	17.4%	0.8%
Self-Pay	2492	4.0%	0.4%
Total	37939	100.0%	0.0%
Region			
Northeast	7768	18.3%	1.4%
Midwest	10619	22.7%	2.0%
South	12855	37.1%	2.1%
West	11408	21.9%	1.7%
Total	42450	100.0%	0.0%

Variable	Unweighted Observations	Percent	Standard Error
Ethnicity			
Hispanic	7214	14.0%	1.3%
Non-Hispanic	34236	86.0%	1.3%
Total	42450	100.0%	0.0%

Table 4.3 Delivery of Selected Health Education Services

Variable	Unweighted Observations	Percent	Standard Error
Any Health Education			
No	22868	54.6%	1.3%
Yes	19582	45.4%	1.3%
Total	42450	100.0%	0.0%
Exercise Education			
No	38053	89.4%	0.6%
Yes	4397	10.6%	0.6%
Total	42450	100.0%	0.0%
Tobacco Cessation			
No	40432	95.1%	0.3%
Yes	2018	4.9%	0.3%
Total	42450	100.0%	0.0%
Weight Reduction			
No	39673	95.1%	0.2%
Yes	2015	4.8%	0.2%
Total	42450	100.0%	0.0%

Table 4.4: Bi-Variate Analysis of Physician Characteristics-Exercise

Education Provided: Exercise	Unweighted Observations	Services Provided				P value
		Yes	S.E.	No	S.E.	
Office Setting						.388
PGP	29396	10.7%	0.7%	89.3%	0.7%	
CHC	10127	9.3%	1.5%	90.7%	1.5%	
Total	39523					

% Capitation						.639
less than 25.0	33668	10.1%	0.7%	89.9%	0.7%	
26.0-50.0%	2124	7.7%	2.1%	92.3%	2.1%	
51.0-75.0%	1413	10.0%	2.9%	90.0%	2.9%	
Total	37205					
E.H.R Use						.281
Yes	18764	11.5%	0.9%	88.5%	0.9%	
No	17626	10.0%	1.1%	90.0%	1.1%	
Total	36390					
MD or DO						.500
MD	36562	10.5%	0.7%	89.5%	0.7%	
DO	5888	11.3%	1.9%	88.7%	1.9%	
Total	42450					
Accepts New Capitation						.412
Yes	22657	10.7%	0.9%	89.3%	0.9%	
No	13811	9.5%	1.0%	90.5%	1.0%	
Total	36468					
E Mail Consults						**.013**
Yes	4488	14.6%	1.8%	85.4%	1.8%	
No	36391	10.1%	0.7%	89.9%	0.7%	
Total	40879					
Phone Consults						.096
Yes	22964	11.4%	0.9%	88.6%	0.9%	
No	17695	9.3%	0.8%	90.7%	0.8%	
Total	40659					

Table 4.5: Bi-Variate Analysis of Physician Characteristics - Health Ed

Education Provided: Any Health Education	**Unweighted Observations**	**Services Provided**				**P value**
		Yes	S.E.	No	S.E	
Office Setting						.717
		Yes	S.E.	No	S.E.	
PGP	29396	45.4%	1.5%	54.6%	1.5%	
CHC	10127	44.0%	3.4%	56.0%	3.4%	

Education Provided: Any Health Education	Unweighted Observations	Services Provided				P value
Total	39523					
% Capitation						.608
less than 25.0	33668	44.2%	1.5%	55.8%	1.5%	
26.0-50.0%	2124	47.9%	4.9%	52.1%	4.9%	
51.0-75.0%	1413	43.2%	4.5%	58.8%	4.5%	
Total	37205					
E.H.R Use						**.018**
Yes	18764	47.9%	1.8%	52.1%	1.8%	
No	17626	42.3%	1.9%	57.7%	1.8%	
Total	36390					
MD/DO						.104
MD	36562	45.8%	1.4%	54.2%	1.4%	
DO	5888	41.1%	2.5%	58.9%	2.5%	
Total	42450					
Accepts New Capitation						.412
Yes	22657	46.3%	1.8%	53.7%	1.8%	
No	13811	42.9%	2.1%	57.1%	2.1%	
Total	36468					
E Mail Consults						.181
Yes	4427	49.4%	3.8%	50.6%	3.8%	
No	35705	44.3%	1.3%	55.7%	1.3%	
Total	40132					
Phone Consults						**.005**
Yes	22964	48.3%	1.8%	51.7%	1.8%	
No	17695	41.3%	1.7%	58.7%	1.7%	
Total	40659					

Table 4.6: Bi-Variate Analysis of Physician Characteristics – Tobacco

Education Provided: Tobacco	Unweighted Observations	Services Provided				P value
		Yes	S.E.	No	S.E.	

Office Setting						**.055**
PGP	29396	3.9%	0.3%	96.1%	0.3%	
CHC	10127	6.3%	1.5%	93.7%	1.5%	
Total	39523					
% Capitation						.254
less than 25.0	33668	3.9%	0.3%	96.1%	0.3%	
26.0-50.0%	2124	3.5%	0.7%	96.5%	0.7%	
51.0-75.0%	1413	2.3%	0.6%	97.7%	0.6%	
Total	37205					
E.H.R. Use						.106
Yes	18764	4.4%	0.4%	95.6%	0.4%	
No	17626	3.4%	0.4%	96.6%	0.4%	
Total	36390					
MD/DO						.955
MD	36562	4.0%	0.3%	96.0%	0.3%	
DO	5888	4.0%	0.3%	96.0%	0.8%	
Total	42450					
Accepts New Capitation						.784
Yes	22657	3.6%	0.3%	96.4%	0.3%	
No	13811	3.7%	0.4%	96.3%	0.4%	
Total	36468					
E Mail Consults						.068
Yes	4488	5.5%	1.1%	94.5%	1.1%	
No	36391	3.7%	0.3%	96.3%	0.3%	
Total	40879					
Phone Consults						.320
Yes	22964	4.2%	0.4%	95.8%	0.4%	
No	17695	3.6%	0.4%	96.4%	0.4%	
Total	40659					

Table 4.7: Bi-Variate Analysis of Physician Characteristics – Weight Reduction

Education Provided: Weight Reduction	**Unweighted Observations**	**Services Provided**				**P value**
		Yes	S.E.	No	S.E.	

Office Setting						.753
PGP	29396	4.9%	0.3%	95.1%	0.3%	
CHC	10127	4.7%	0.6%	95.3%	0.6%	
Total	39523					
% Capitation						.566
less than 25.0	33668	4.6%	0.3%	95.4%	0.3%	
26.0-50.0%	2124	5.5%	1.8%	94.5%	1.8%	
51.0-75.0%	1413	6.7%	2.7%	93.3%	2.7%	
Total	37205					
E.H.R. Use						.104
Yes	18764	4.4%	0.4%	95.6%	0.4%	
No	17626	5.6%	0.6%	94.4%	0.6%	
Total	36390					
MD or DO						.660
MD	36562	4.8%	0.3%	95.2%	0.3%	
DO	5888	5.5%	1.4%	94.5%	1.4%	
Total	42450					
Accepts New Capitation						.912
Yes	22657	4.6%	0.4%	95.4%	0.4%	
No	13811	4.7%	0.6%	95.3%	0.6%	
Total	36468					
E Mail Consults						.555
Yes	4488	5.4%	0.9%	94.6%	0.9%	
No	36391	4.9%	0.3%	95.1%	0.3%	
Total	40879					
Phone Consults						.477
Yes	22964	5.1%	0.4%	94.9%	0.4%	
No	17695	4.6%	0.5%	95.4%	0.5%	
Total	40659					

Table 4.8 Multivariable Analysis: Logistic Regression -Tobacco

	Model 1				**Model 2**			
	MD Characteristics				**MD and Patient Characteristics**			
Variable	AOR	LCL	UCL	p value	AOR	LCL	UCL	p value

Office Setting				**.028**				.311
PGPs	.440	.211	.918		.692	.339	1.414	
CHCs	1.000							
% Capitation				.160				.287
<25.0	1.559	.881	2.761		1.572	.734	3.363	
26.0% - 50.0%	1.856	.919	3.748		1.849	.789	4.334	
51.0% - 75.0%	1.000				1.000			
E.H.R Use				**.002**				**.002**
Yes	1.646	1.206	2.247		1.645	1.198	2.259	
No	1.000				1.000			
MD or DO					1.087	.676	1.748	.730
MD	1.093	.710	1.684	.685				
DO	1.000							
Accepts Capitation				.558				.641
Yes	.887	.594	1.326		.917	.636	1.322	
No	1.000							
Phone Consults				.817				.640
Yes	.956	.652	1.402		.914	.626	1.335	
Variable	AOR	LCL	UCL	p value	AOR	LCL	UCL	p value
No	1.000							
E Mail Consults								.158
Yes	.782	.449	1.363	.384	.662	.372	1.177	
No	1.000							
Age Group								**<0.005**
<15 years					3.240	1.285	8.169	
15 - 24					3.600	1.550	8.361	
25 - 44					4.179	1.877	9.306	

45 - 64					5.705	2.680	12.145	
65 - 74					2.940	1.378	6.272	
75>					1.000			
Race								.894
White					1.181	.453	3.077	
Black					.812	.306	2.155	
Other					1.00			
Payment Type								**.008**
Private Insurance					.861	.586	1.264	
Medicaid					2.211	1.314	3.719	
Self-Pay					1.000			
Region								.622
Northeast					1.419	.753	2.672	
Midwest					1.335	.791	2.253	
South					1.289	.786	2.113	
West					1.000			
Sex								**.004**
Female					.702	.553	.892	
Male					1.000			
Ethnicity								.271
Hispanic					.778	.387	1.218	
Non-Hispanic					1.000			

Table 4.9 Multivariable Analysis: Logistic Regression -Exercise

Model 1
MD Characteristics

Model 2
MD and Patient Characteristics

Variable	AOR	LCL	UCL	P value	AOR	LCL	UCL	P value
Office Setting				.858				.639
PGPs	.956	.582	1.569		1.126	.684	1.854	
CHCs	1.000				1.000			

% Capitation				.891				.710
<25.0	.959	.439	2.093		.837	.405	1.728	
26.0% - 50.0%	.804	.294	2.200		.700	.270	1.814	
51.0% - 75.0%	1.000				1.000			
E.H.R Use				.389				.354
Yes	1.174	.814	1.693		1.120	.774	1.619	
No	1.000				1.000			
MD or DO				.294				.832
MD	.746	.430	1.293		.780	.461	1.321	
DO	1.000				1.000			
Accepts Capitation				.916				.760
Yes	1.020	.699	1.489		.944	.650	1.370	
No	1.000				1.000			
Phone Consults				.391				.206
No	.851	.587	1.233		.776	.523	1.151	
Yes	1.000				1.000			
E Mail Consults				.437				.541
No	.814	.484	1.369		.823	.440	1.539	
Yes	1.000				1.000			
Age Group								**.016**
<15 years					.435	.250	.758	
15 - 24					.774	.516	1.161	
25 - 44					.686	.506	.932	
45 - 64					1.180	.879	1.585	
65 - 74					1.084	.819	1.436	
75>					1.000			
Race								.162
White					1.399	.839	2.355	
Black					1.671	.930	3.002	
Other					1.000			

Payment Type								.105
Private Insurance					.649	.284	1.483	
Medicare					.539	.226	1.289	
Medicaid					.439	.203	.952	
Self-Pay					1.000			
Region								.247
Northeast					.649	.393	1.072	
Midwest					.898	.551	1.463	
South					.761	.506	1.147	
West					1.000			
Sex								**.012**
Female					.800	.673	.952	
Male					1.000			
Ethnicity								**<0.005**
Hispanic					1.629	1.237	2.145	
Non-Hispanic					1.000			

Table 4.10 Multivariable Analysis: Logistic Regression - Weight Reduction

Model 1
MD Characteristics

Model 2
MD and Patient Characteristics

Variable	AOR	LCL	UCL	p value	AOR	LCL	UCL	p value
Office Setting				.962				.406
PGPs	.990	.652	1.504		1.271	.720	2.245	
CHCs	1.000							
% Capitation				.615				.302
<25.0%	.620	.213	1.809		.489	.177	1.347	
26.0% - 50.0%	.950	.261	3.462		.762	.217	2.672	
51.0%- 75.0%	1.000				1.000			
E.H.R. Use				.279				.141
Yes	.804	.540	1.196		.756	.521	1.098	

No	1.000				1.000			
MD or DO				.609				.832
MD	.798	.334	1.905		.916	.405	2.071	
DO	1.000							
Accepts Capitation				.633				.300
Yes	.915	.636	1.317		.839	.601	1.171	
No	1.000				1.000			
Phone Consults				.915				.391
Yes	.978	.656	1.460		.835	.553	1.262	
No	1.000				1.000			
E Mail Consults				.389				.415
No	1.225	.747	2.108		1.256	.724	2.179	
Yes	1.000				1.000			
Age Group								**<.0001**
<15					.015	.071	.319	
15-24					.692	.376	1.275	
25-44					1.191	.705	2.012	
45-64					1.853	1.217	2.852	
65-74					1.650	1.052	2.588	
75>					1.000			
Race								.201
White					1.353	.665	2.753	
Black					1.826	.877	3.802	
Other					1.000			
Payment Type								.312
Private Insurance					.456	.160	1.303	
Medicare					.425	.138	1.306	
Medicaid					.430	.149	1.241	
Self-Pay					1.000			
Region								**.005**
Northeast					1.511	.888	2.571	
Midwest					2.110	1.317	3.381	

South					1.749	1.136	2.693	
West					1.000			
								.204
Sex								
Female					.857	.676	1.088	
Male					1.000			
Ethnicity								**.011**
Hispanic					1.591	1.109	2.283	
Non-Hispanic					1.000			

Table 4.11 Multivariable Analysis: Logistic Regression - Health Education

	Model 1 MD Characteristics				Model 2 MD and Patient Characteristics			
Variable	AOR	LCL	UCL	p value	AOR	LCL	UCL	p value
Office Setting				.618				.110
PGPs	1.080	.797	1.465		1.307	.940	1.817	
CHCs	1.000				1.000			
% Capitation				.443				.263
<25.0	1.226	.767	1.961		1.383	.873	2.192	
26.0% - 50.0%	1.471	.756	2.861		1.657	.843	3.258	
51.0% - 75.0%	1.000				1.000			
E.H.R Use				.160				.119
Yes	1.183	.935	1.496		1.213	.951	1.547	
No	1.000				1.000			
MD or DO				.873				.880
MD	1.027	.740	1.427		.974	.691	1.373	
DO	1.000				1.000			
Accepts Capitation				.507				.459
Yes	1.098	.831	1.451			1.112	.838	1.477
No	1.000					1.000		

Phone Consults				**.025**				**.033**
No	.753	.588	.965		.760	.591	.979	
Yes	1.000				1.000			
E Mail Consults				.408				.529
No	1.188	.789	1.789		1.142	.754	1.728	
Yes	1.000				1.000			
Age Group								**.017**
<15					1.599	1.147	2.229	
15 - 24					1.491	1.126	1.975	
25 - 44					1.306	1.033	1.652	
45 - 64					1.391	1.114	1.735	
65 - 74					1.135	.921	1.399	
>75					1.000			
Race								.368
White					1.055	.729	1.528	
Black					1.304	.864	1.969	
Other					1.000			
Payment Type								.630
Private Insurance					.839	.592	1.187	
Medicare					.828	.574	1.195	
Medicaid					.831	.593	1.166	
Self-Pay					1.000			
Region								.956
Northeast					1.056	.755	1.478	
Midwest					.924	.657	1.298	
South					.987	.679	1.434	
West					1.000			
Sex								.432
Female					.957	.858	1.068	
Male					1.000			
Ethnicity								..286
Hispanic					1.171	.875	1.567	

Variable	AOR	LCL	UCL	p value	AOR	LCL	UCL	p value
Non-Hispanic					1.000			

Chapter 5

Discussion

5.1 Background

Chapter 5 of the study is focused on identifying recommendations associated with improving the provision health education services for patients with chronic disease. It consists of the following: 1) Background of Problem 2) Discussion of Findings 3) Study Limitations and 4) Study Implications.

The issues that restrain the delivery of essential health education services patients of primary care physicians are complex and many. They range from the abstract such as professional preferences of physicians, (Mirand et al., 2003) to the concrete as payment mechanisms that structurally do not incorporate health education services in their design, (Berenson & Rich, 2010). The issue is a vexing one, as most physicians have for some time agreed with the utility of such services in patient care, (Wechsler, Levine, Idelson, Rohman, & Taylor, 1983), a formidable, scientific clearinghouse for promulgating the evidence basis for use now exists (USPSTF), and the technological capability to effect knowledge transfer from research to practice affordably is in place with use of internet capability. Despite these advantages, performance of these services remains weak and identification of the characteristics that lend to improved performance remains difficult to discern.

5.2 Discussion of Findings

The study conducted bi-variate and multi-variate analyses to determine important relationships pertinent to provision of selected categories of health education. The population of study was a sample of 42,450 visits to primary care physicians for the years 2009-2011. Two of the hypotheses in the study were partially supported by the findings. One hypothesis was completely unsupported by the findings. Research Question 1 asked is there a significant difference in the health education scores of patient visits of highly capitated primary care physician practices and lower capitated physician practices?

The study hypothesized that Health education scores will be higher for patient visits when capitation increases as a percentage of practice revenue compared to patient visits of physicians with lower percentages of capitation revenue. The findings obtained did not support this hypothesis in the study as no association was found between levels of capitation and provision of health education services. Prior work, (Pearson et al., 2013) proved an association between overall health education and the highest level of capitation (greater than 75.0%). The work done by Pearson did not search for an association between specific risk factors, (smoking, exercise, weight reduction) as this study did. Rather, the Pearson study focused on finding an association between overall health education and capitation. The Pearson study like this study reduced the total sample of physicians by selecting only primary care physicians. The variable the Pearson study used to select a primary care physician dataset was termed “PRIMCARE”, which asked are you the patient’s primary care physician. This

study used the variable SPECCAT, and selected the entire grouping of primary care physicians (SPECCAT =1) available in the dataset. While the Pearson study was able to provide an analysis of an association between the highest level of capitation and health education provision, this study was precluded a comparison of health education provision at the highest level of capitation (>75.0%). No observations were present at the greater than 75.0% level, therefore an analysis was prohibited. The study found no association for health education provision at any of the lower levels of capitation.

Research Question 2 asked is there a significant difference in the health education scores of patient visits of physicians who use an Electronic Heath Record and those physicians that do not. The study hypothesized that Health education scores will be significantly higher for patient visits of physicians who employ full use of electronic health record systems versus physicians who do not use an electronic health record system in practice.

The findings obtained partially supported the hypothesis that use of electronic health record systems is associated with provision of tobacco cessation. The study found an association between the any health education variable and electronic health record use. The study found no association for the exercise or weight reduction variables.

Prior work done by Linder, et.al, using the NAMCS 2003 and 2004 datasets attempted to prove an association between E.H.R. use and ambulatory care quality, (Linder et al., 2007). A key finding of the study was the determination of an association between E.H.R. use and provision of tobacco education. Primary

care and cardiovascular disease physicians provided smoking cessation counseling to adult smokers at general medical examination visits more frequently at visits associated with E.H.R. use (39%;95%, CI,29-49) vs without E.H.R. use (25%; 95% CI, 21-30; P=.03), (Linder et al., 2007). The Linder study found no association with other health education variables and E.H.R. use.

Research Question 3 asks is there a significant difference in the health education score of patient visits of primary care physicians who work in community health centers as their practice setting, and primary care physicians that work in private group and solo practice settings? The study hypothesized that Health education scores will be lower for patient visits of physicians who work in private group practice settings than visits of primary care physicians of community health center settings.

For the variable tobacco cessation, the findings of the study support the hypothesis that health education scores of patient visits to private group practices are lower than those visits in community health centers. The study's design departed from that of a previous study that used NAMCS 2003 dataset. In that study, researchers L. Shi, et.al., concluded that health education is offered more frequently in community health centers than in private group practices,(Shi et al., 2010). Shi proved that smoking cessation is offered more frequently by CHCs **to patients who smoke** than PGPs, that weight reduction was offered **to patients at a BMI of 30 or more**, and finally that asthma education was offered more frequently by CHCs **to diagnosed asthmatics** than in PGPs. This study sought

to find an association between various health education services and **all** patients irrespective of presence of a specific risk factor.

The study's intention was to find whether a significant association existed with all four health education dependent variables. The findings obtained show only an association for the tobacco education dependent variable. Pursuant to the research questions, no association was found between the predictor variables and the exercise and weight reduction dependent variables.

The study failed to support the hypothesis that increasing capitation affects the provision of health education services. The study lends some support to the importance of electronic health record system use by all physicians especially primary care physicians in providing health education, (tobacco use). The study findings partially supported the hypothesis that private group practices offer health education services (tobacco use) less frequently than community health centers. This is particularly pertinent as a secondary finding of the study showed that Medicaid sponsored patient visits are more likely to receive tobacco cessation education as uninsured patients (OR 2.21, CI p=0.08). Health Centers are large providers of Medicaid primary care visits as in the aggregate over 50% of health center patients are Medicaid recipients, and 39.0% of health center patients are uninsured, (Shi et al., 2010). However, only 13.6% of private group practice patients are Medicaid beneficiaries, and 3.8% are uninsured, (Shi et al., 2010).

The study found a consistent association between age group of patients and provision of health education services. For tobacco education, and using patients

older than 75 years as the referent group, odds ratios were considerably higher for each age group, (OR 3.24, 4.17, 5.70, 2.94, $p<0.001$). Similar findings were obtained for the any health education variable as odds ratios were higher for patients aged 15 – 24 (OR 1.491), 25-44 (OR 1.306), and patients aged 45-64 (1.391) compared to the 75> referent group, ($p=0.17$). The study found no association with patient visits in the 65-74 age group. Weight Reduction counseling shows association with adult patient visits in age groups 45-64 (OR 1.853) and 65-74 (OR 1.650). The study found Weight Reduction counseling to be negatively associated with visits in the pediatric and adolescent age group <15 years, (OR .150).

5.3 Limitations of Study

The study attempts to determine if a statistically significant association exists between provision of health education and certain practice considerations. The study is a cross-sectional study consequently any relationships observed should be viewed as a snapshot in time versus a longitudinal relationship. A second limitation is that for research question 1 that examines the relationship with levels of capitation, the dataset does not offer the study the ability to determine if specific visits were exclusively under a capitated arrangement or exclusively under a fee for service arrangement. A preferred analysis would have the capability to statistically analyze health education performance for visits under identical capitation arrangements and test for differences under strictly fee for service arrangements.

Third, certain study variables found during the literature review that could have proved useful as covariates were not available for study in the NAMCS dataset. Although the study found and used variables such as teleconferencing and e mail use by primary care physicians, the study would have liked to examine other variables such as the effect of previously mentioned Interactive Behavioral Change Technologies (ICBTs), physician use of classes for patient education in chronic disease, physician use of pharmacists in medication therapy management, and use of other midlevel personnel for education. These variables were not available. These are categorical variables that were grounded in the literature for which the study would have considered.

Fourth, the study acknowledges that health education services are provided by other clinical professionals beyond primary care physicians though no other personnel were surveyed in this study. Approximately one third of primary care visits to health centers utilized nurse practitioners, physician assistants and certified nurse midwives as providers, (Hing, Hooker, & Ashman, 2011). Private group practice physicians are less likely to utilize midlevel providers such as these compared to health center physicians. The measurement of the extent of health education provision is made more difficult in that midlevel providers are more likely to document provision of health education services compared to primary care physicians, (Hing et al., 2011).

Finally, after removal of the office setting variables that were not of interest to the study, the remaining NAMCS dataset yielded 95.2% of the observations as private group practice visits and 4.8% as community health center visits. The

study would have preferred a more equitable distribution of observations to conduct its analysis. NAMCS documentation refers to the underrepresentation of community health center observations in its data set in its data documentation (2009 National Ambulatory Medical Care Survey Public Use Data File Documentation)

5.4 Implications of Study

The study lends support for the continued expansion and use of electronic health record systems in the management of chronic disease and for its ability to facilitate health education by primary care physicians. The study demonstrated a relationship between E.H.R. use and tobacco cessation, and for E.H.R. use and the overall health education variable. Today, ninety-two percent of community health centers use certified E.H.Rs while seventy-eight percent of primary care practices use these systems overall, (“NACHC A Sketch of Community Health Centers-Chart Book 2014,”). Some form of financial or programmatic initiative should occur to allow mainstream private group practices to “catch up to” or “close the gap with” community health centers beyond meaningful use initiatives.

Second, the study lends support for the continued expansion of community health centers. Since 2003, the number of community health centers has grown from 890 grantees to 1200 in 2013. The example the study provides regarding tobacco cessation shows how patient education is incorporated into the care model of health centers. Research has shown that health centers provide care to more patients with chronic disease and provide more preventive health services than private group practices,(Shi, Leiyu & Tsai, Jenna, 2010) Also, patients are

more likely to comply with counseling efforts regarding diet, exercise and medications than non- health center patients,(NACHC A Sketch of Community Health Centers-Chart Book 2014,). Because of their performance in providing health education, the fact that chronic disease conditions comprise a greater percentage of health center patients than for private group practices, and because of the grounding health centers have received in the Wagner Chronic Care Model, the rationale for continued development and proliferation of health centers is supported by the findings of this study.

Third, the study lends support for potential benefits of Medicaid program. The study found for tobacco cessation that Medicaid patients are twice as likely to receive tobacco cessation counseling than uninsured patients, (OR 2.211, p=.008). In 2013 Health Centers encountered 8.8 million Medicaid recipients, and 7.6 million uninsured patients, ("NACHC A Sketch of Community Health Centers-Chart Book 2014,"). The cost reimbursement aspect of Medicaid reimbursement for health centers affords health centers the capability to offer case management and other enabling services that increase health education provision and compliance. With Medicaid expansion, the financial means are present to offer vulnerable populations access to chronic disease management. The study shows that uninsured patients are less likely to receive health education services.

Patient Centered Medical Home accreditation may provide another driver for provision of health education services in primary care. Provision of health education services are requirements for accreditation in PCMH. A future research question would be to examine performance of PCMH accredited

primary care practices and non-accredited practices with respect to provision of health education services. Sixty five percent of health centers are accredited as PCMH compared to 10.0% of practices nationally, ("NACHC A Sketch of Community Health Centers-Chart Book 2014,"). Primary Care Medical Homes, (PCMHs), and Accountable Care Organizations, (ACOs), will be two structural elements of delivery system reform. Though they will occur in many organizational formats, an ACO will be a provider-led organization whose mission will be to manage the full continuum of care and to be accountable for the overall costs and quality of care for a defined population, (Rittenhouse, Shortell, & Fisher, 2009), (Landon et al., 2010). For being accountable for this care, physicians get to share in the financial savings that inure to the ACO through driving downward unneeded medical utilization. Capitation payment methods and Patient Centered Medical Homes are structural components of ACO arrangements. These two evolutionary concepts focus responsibility for costs and quality across a continuum of care and also facilitate provision of enhanced primary care services such as health education, (Landon et al., 2010), more so than fee for service payment. Research has shown that higher achievement scores under PCMH is associated with higher receipt of preventive services by patients, (Ferrante, Balasubramanian, Hudson, & Crabtree, 2010). Each 1.0% increase in a practice's global PCMH score is associated with a 2.3% increase in the score of up to date preventive services, (Ferrante et al., 2010).

The study detailed several practice characteristics that could serve as drivers of provision of health education. E.H.R. use, adoption of the Wagner Chronic

Care Model and use of community health centers are several examples. Whatever reconstruction of physician payment will occur, the findings clearly show that salient components such as these in addition to the change from fee for service to capitation will be required to effect the sea change needed to the meet the new threshold of chronic disease presented by patients today.

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